United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with Illinois Agricultural Experiment Station

Soil Survey of Mason County, Illinois

How To Use This Soil Survey

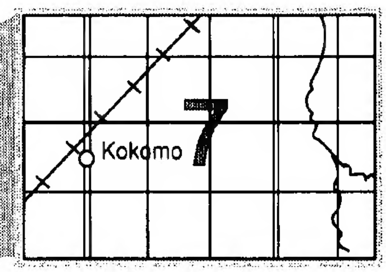
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

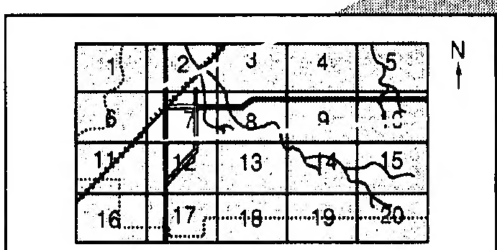
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



MAP SHEET

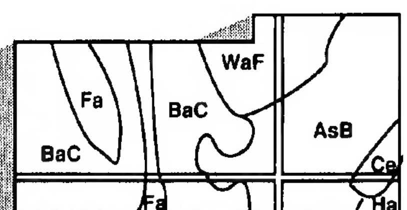
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.

MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1988. Soil names and descriptions were approved in 1989. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This survey was made cooperatively by the Natural Resources Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Mason County Soil and Water Conservation District. Funding was provided by the Mason County Board and the Illinois Department of Agriculture.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

This soil survey is Illinois Agricultural Experiment Station Soil Report 146.

All programs and services of the Natural Resources Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin religion, sex, age, marital status, or handicap.

Cover: Contour farming, grassed-backslope terraces, and grassed waterways help to control erosion in this area of Tama silt loam, 0 to 2 percent slopes.

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Issued December 1995

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Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Mason County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

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State Conservationist
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Soil Survey of Mason County, Illinois

By Dale E. Calsyn, Natural Resources Conservation Service

Soils surveyed by Dale E. Calsyn and Jerome G. Neppel, Natural Resources Conservation Service, and Larry L. Gramm, Paul R. Krahn, and David G. Lohnes, Mason County

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
the Illinois Agricultural Experiment Station

Mason County is in the west-central part of Illinois (fig. 1). It has an area of 360,510 acres, or about 562 square miles. It is bounded on the south by Cass and Menard Counties, on the west by the Illinois River, on the north by Tazewell County, and on the east by Logan and Tazewell Counties.

In 1980, the population of Mason County was 19,492. Havana, the county seat and largest city, had a population of 4,277.

This soil survey updates the survey of Mason County published by the University of Illinois in 1924 *(8)*. It provides more recent information and has larger maps, which show the soils in greater detail.

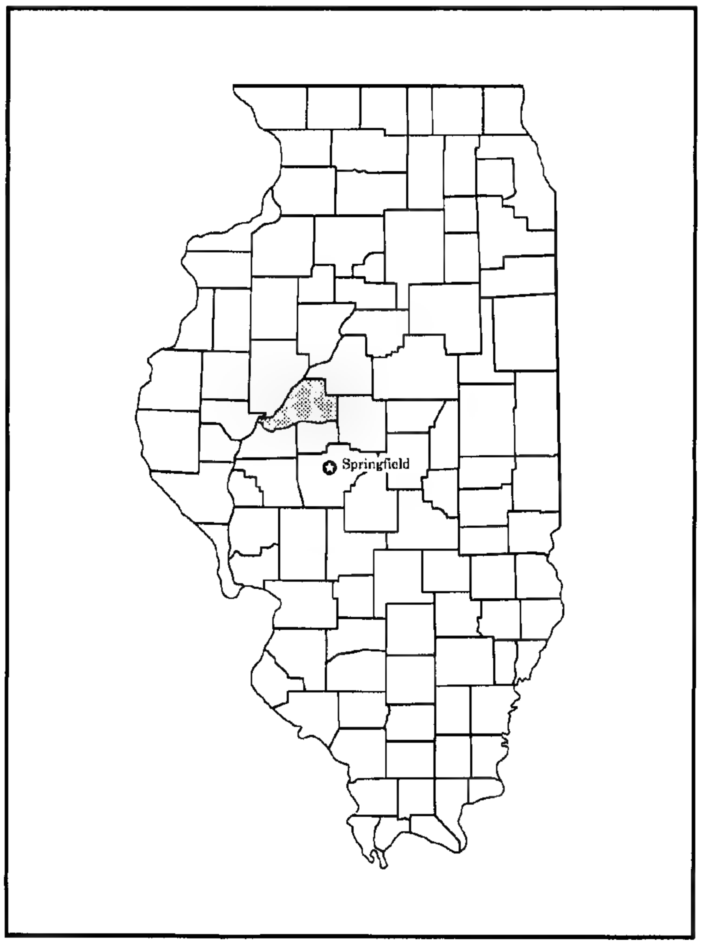

Figure 1.—Location of Mason County in Illinois.

General Nature of the County

This section gives general information about Mason County. It describes settlement and development, farming, physiography and drainage, and climate.

Settlement and Development

The survey area was inhabited by Indians prior to the first white settlements. The area was surveyed and opened for settlement from 1821 to 1824. The first settler was James Hoakum, who operated a ferry near the present-day site of Havana. Mason County was formed from parts of Menard and Tazewell Counties in 1841.

Agriculture increased in the county after grain mills were built. Another important development was the

introduction of irrigation in the area in 1954. Because irrigation provides an additional source of water, Mason County farmers can grow specialty crops, such as pumpkins, popcorn, and tomatoes *(7)*.

A huge underground aquifer lies beneath Mason County. Its water is mainly used for irrigation, but the aquifer could supply water for industries that develop in the area *(13)*.

Mason County has well developed transportation facilities. These include Federal and State highways, railroads, barges, and small airfields. U.S. Highway 136 and State Highways 10, 29, 78, and 97 provide good access to cities, towns, and outlying areas throughout the county.

Farming

Farming is a major enterprise in Mason County, and 88 percent of the county is used for farming. In 1982, there were 672 farms in the county and the average farm size was 454 acres *(12)*. Corn, soybeans, and wheat are the major crops. In 1986, about 106,000 acres was used for corn, about 108,700 acres was used for soybeans, and about 33,000 acres was used for wheat *(6)*. Mason County produces a wide variety of crops because of its sandy soils and the wide use of irrigation. The county is a leading producer of watermelons, pumpkins, and cantaloupes. Also grown in the county are sorghum, oats, sunflowers, popcorn, tomatoes, strawberries, sweet corn, cucumbers, and Christmas trees. Hogs and cattle are the main livestock. In 1986, the number of swine was 23,900 and the total number of cattle was 10,200 *(6)*.

Physiography and Drainage

The topography of Mason County consists of uplands, stream terraces, dunes, and flood plains.

The majority of the county consists of the Manito, Havana, and Bath-Beardstown terraces. These three terraces consist of well sorted sand and gravel deposited by the glacial meltwaters of the Woodfordian period. In some areas water-deposited, loamy or silty material is on top of the sand. Stabilized dunes are very common on the terraces. These dunes consist of sand that was deposited by glacial meltwaters and reworked by the wind. Many of the dunes rise 25 to 100 feet above the level of the terraces *(13)*.

The uplands, which are in the southeastern third of Mason County, are remnants of glacial till deposits from the Illinoian glacial advance. The loamy and gravelly till is covered by loess, which is more than 25 feet thick in some places *(4)*. The till crops out in some areas. In other areas sand is below deposits of loamy or silty material. The source of this sand is the underlying terrace *(13)*.

The flood plains along the Illinois and Sangamon Rivers consist of alluvium, which is poorly graded sand, silt, and clay. Water in the main drainageways flows to the south and west. The northern part of the county is drained by Quiver Creek, which empties into the Illinois River. The southern part of the county is drained by Crane Creek and Salt Creek, which flow into the Sangamon River. The Sangamon River empties into the Illinois River.

Climate

The Illinois State Water Survey helped prepare this section.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Peoria in the period 1951 to 1980. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 25.4 degrees F and the average daily minimum temperature is 17.3 degrees. The lowest temperature on record, which occurred at Peoria in 1977, is -25 degrees. In summer, the average temperature is 73.1 degrees and the average daily maximum temperature is 83.7 degrees. The highest recorded temperature, which occurred at Peoria in 1966, is 102 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 33.78 inches. Of this, 20.81 inches, or about 60 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 17.19 inches. The heaviest 1-day rainfall during the period of record was 5.12 inches.

The average seasonal snowfall is 24.6 inches. The greatest snow depth at any one time during the period of record was 16 inches. On the average, 36 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 64 percent. Humidity is higher at night, and the average at dawn is about 83 percent. The sun shines 70 percent of the time possible in summer and 47 percent in winter. The prevailing wind is from the south-

southwest. Average windspeed is highest, 13.8 miles per hour, in March.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; and the kinds of crops and native plants growing on the soils. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed

properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The names of the soils identified on the general soil map in this survey do not fully agree with those of the soils identified on the general soil map in the published soil surveys of adjacent Cass and Logan Counties. Differences are the result of variations in the extent of the major soils in the associations. They do not necessarily affect broad land use planning.

The associations in this county have been grouped for broad interpretive purposes.

Soil Descriptions

Nearly Level to Steep, Excessively Drained to Well Drained, Sandy and Loamy Soils; on Stream Terraces and Dunes

These soils formed in wind- and water-deposited sands and loamy material or in outwash. The less sloping areas are used primarily for cultivated crops, and the more sloping areas are used as pasture or woodland. Soil blowing and droughtiness are the main management concerns.

1. Plainfield-Bloomfield Association

Gently sloping to steep, excessively drained and somewhat excessively drained, sandy soils that formed in wind- and water-deposited sands; on stream terraces and dunes

This association consists of light-colored soils on stream terraces and dunes. Slopes range from 1 to 30 percent.

This association makes up 19 percent of the county. It is about 53 percent Plainfield soils, 27 percent Bloomfield soils, and 20 percent minor soils (fig. 2).

The excessively drained Plainfield soils are on gently sloping to steep dunes and terraces. Typically, the surface layer is dark brown, very friable sand about 9 inches thick. The subsoil is very friable sand about 22 inches thick. The upper part is dark yellowish brown, and the lower part is yellowish brown. The underlying material to a depth of 60 inches or more is yellowish brown, loose sand.

The somewhat excessively drained Bloomfield soils are on gently sloping to strongly sloping dunes and terraces. Typically, the surface layer is mixed dark yellowish brown and dark brown, very friable sand about 8 inches thick. The subsurface layer is loose sand about 37 inches thick. The upper part is dark brown, and the lower part is dark yellowish brown. Below this to a depth of 60 inches or more are alternating bands of dark brown, very friable loamy sand and dark yellowish brown, loose sand.

Of minor extent in this association are Ade, Alvin, Onarga, Sparta, and Watseka soils. Ade, Onarga, Sparta, and Watseka soils are dark. Ade and Sparta soils and the well drained Alvin and Onarga soils are on broad ridges. The somewhat poorly drained Watseka soils are in the lower areas.

The less sloping areas of this association are used mainly for cultivated crops. The more sloping areas are used as woodland or pasture. Because of the hazard of soil blowing and a low available water capacity, Plainfield soils are unsuited to the commonly grown

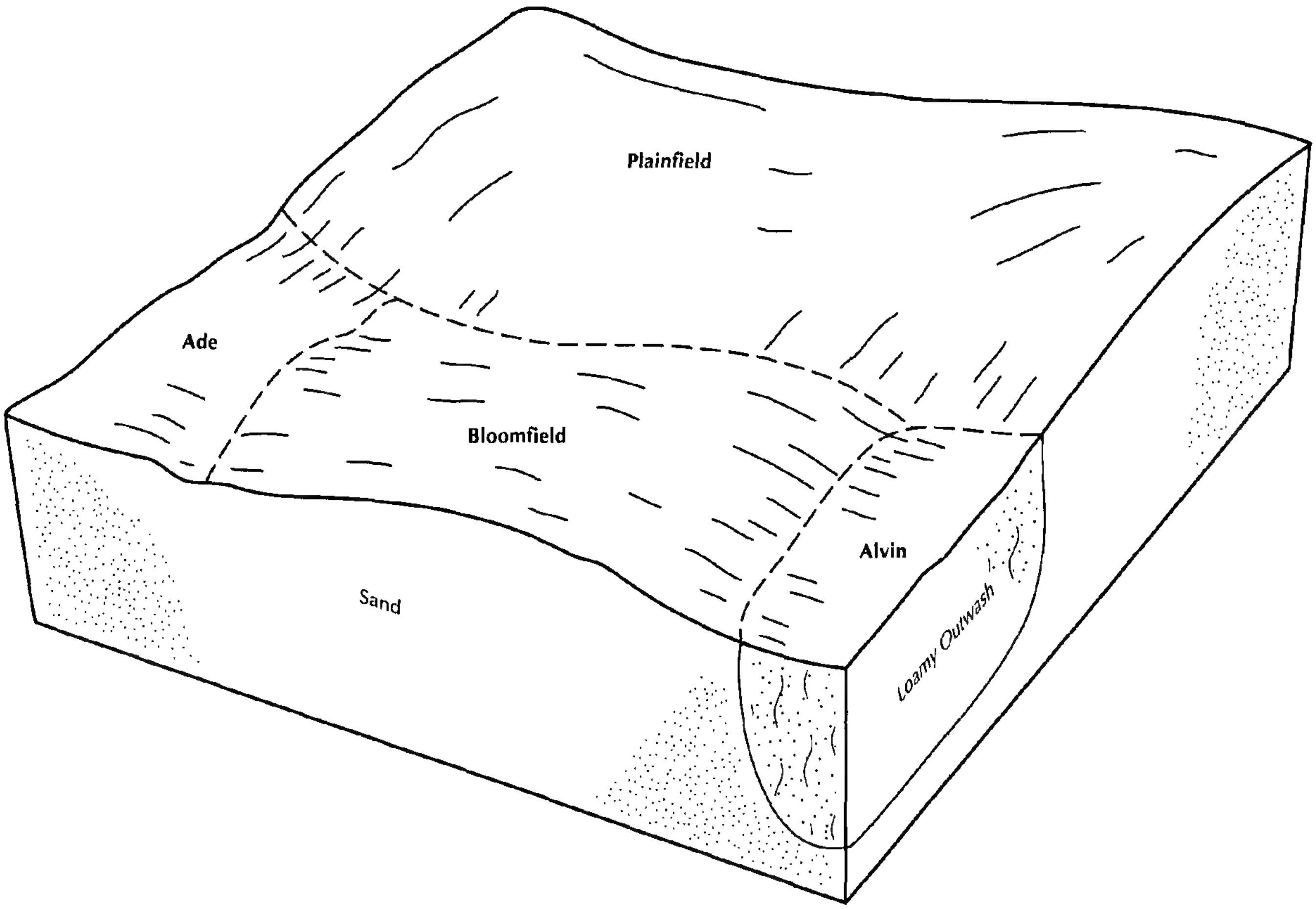

Figure 2.—Typical pattern of soils and parent material in the Plainfield-Bloomfield association.

crops and Bloomfield soils are poorly suited. Irrigated areas of these soils are moderately suited to cultivated crops. The soils are moderately suited to pasture and hay and moderately well suited to woodland.

The gently sloping areas of this association are well suited to building site development. The strongly sloping areas are only moderately suited to this use, however, and steep areas are unsuited. These soils are poorly suited to use as sites for septic tank absorption fields because of a hazard of ground-water contamination.

2. Sparta-Plainfield-Ade Association

Gently sloping to strongly sloping, excessively drained and somewhat excessively drained, sandy and loamy soils that formed in wind- and water-deposited sands and loamy material; on stream terraces and dunes

This association consists of soils on broad ridges and side slopes. Slopes range from 1 to 15 percent.

This association makes up 7 percent of the county. It is about 38 percent Sparta soils, 16 percent Plainfield and similar soils, 15 percent Ade soils, and 31 percent minor soils (fig. 3).

The excessively drained Sparta soils are gently sloping to strongly sloping. They are on broad ridges and convex side slopes. Typically, the surface layer is very dark grayish brown, very friable loamy sand about 9 inches thick. The subsurface layer is dark brown, very friable loamy sand about 14 inches thick. The subsoil is about 15 inches thick. The upper part is brown, very friable loamy sand, and the lower part is dark yellowish brown, very friable sand. The underlying material to a depth of 60 inches or more is loose sand. The upper part is dark yellowish brown, and the lower part is strong brown.

The excessively drained Plainfield soils are gently sloping to strongly sloping. They are on ridges and convex side slopes. Typically, the surface layer is dark brown, very friable sand about 9 inches thick. The subsoil is very friable sand about 22 inches thick. The

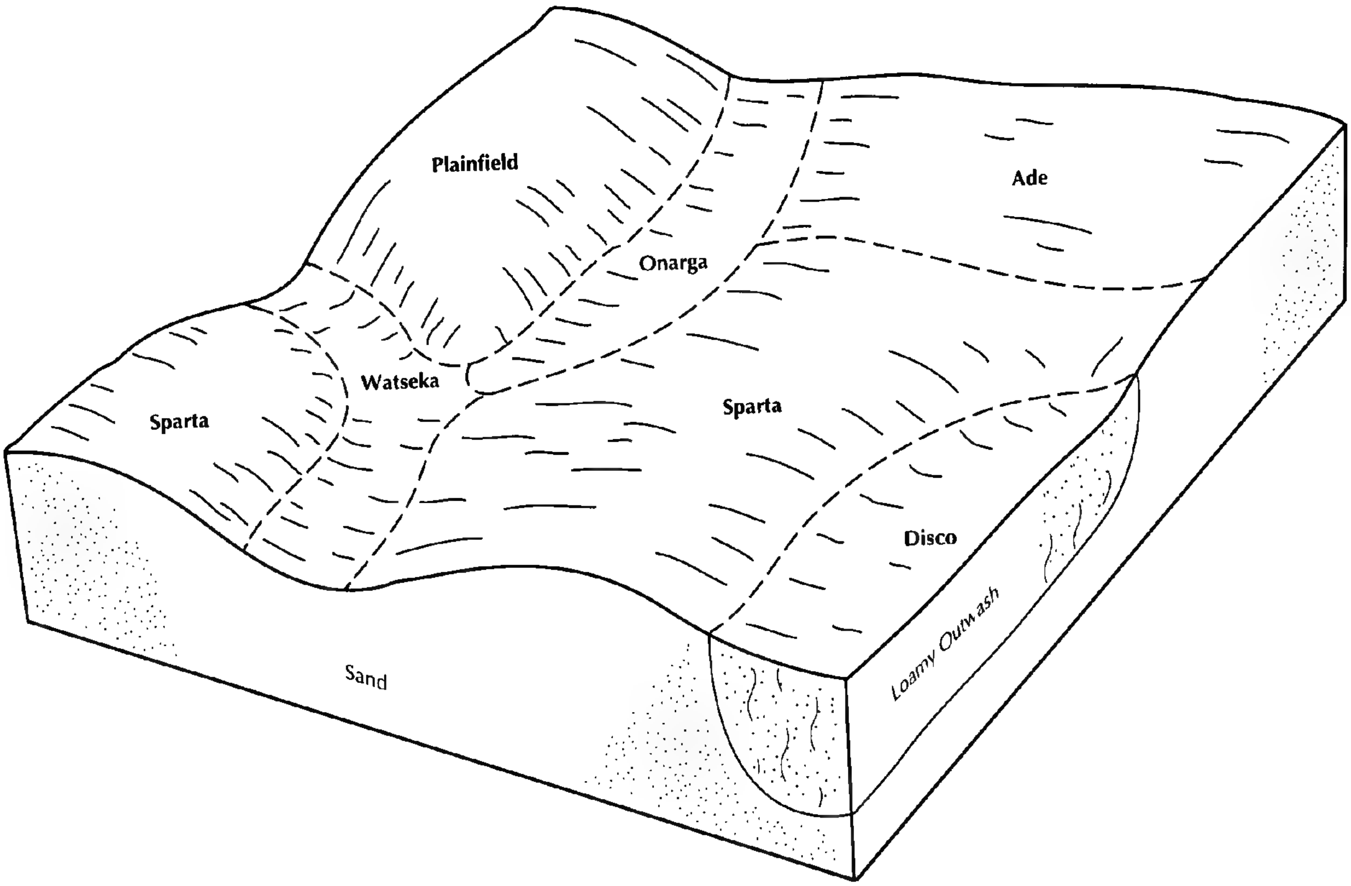

Figure 3.—Typical pattern of soils and parent material in the Sparta-Plainfield-Ade association.

upper part is dark yellowish brown, and the lower part is yellowish brown. The underlying material to a depth of 60 inches or more is yellowish brown, loose sand.

The somewhat excessively drained, gently sloping Ade soils are on broad ridges with convex slopes. Typically, the surface layer is very dark grayish brown, very friable loamy fine sand about 8 inches thick. The subsurface layer is very dark grayish brown and dark brown, very friable loamy fine sand about 14 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is brown, very friable loamy fine sand. The lower part is alternating bands of dark brown, very friable fine sandy loam and dark yellowish brown, loose fine sand.

Of minor extent in this association are Disco, Maumee, Onarga, Ridgeville, and Watseka soils. The well drained Disco and Onarga soils, the somewhat poorly drained Ridgeville and Watseka soils, and the poorly drained Maumee soils are in low areas below the major soils.

In most areas the major soils are used for cultivated crops. Some of the more sloping areas are used for pasture. Because of the hazard of soil blowing and a low available water capacity, Sparta and Ade soils are poorly suited to the commonly grown crops and Plainfield soils are unsuited. Irrigated areas of these soils are moderately suited to cultivated crops. The soils are moderately suited to pasture and hay.

This association is generally well suited to building site development. The strongly sloping areas, however, are only moderately suited. Because of a hazard of ground-water contamination, these soils are poorly suited to use as sites for septic tank absorption fields.

3. Onarga-Dakota-Sparta Association

Nearly level and gently sloping, well drained and excessively drained, loamy and sandy soils that formed in outwash or in wind- and water-deposited sands; on stream terraces

This association consists of soils on broad ridges and side slopes. Slopes range from 0 to 7 percent.

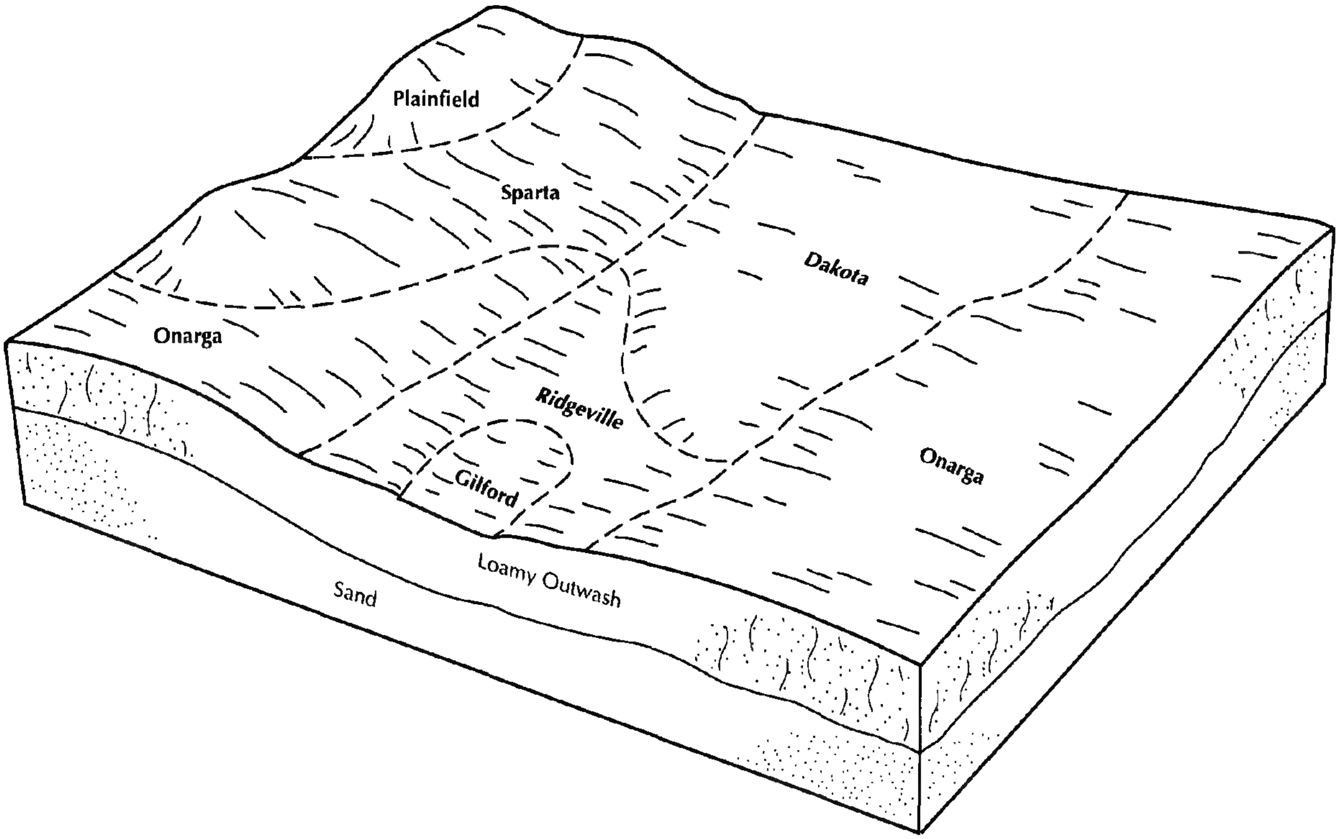

Figure 4.—Typical pattern of soils and parent material in the Onarga-Dakota-Sparta association.

This association makes up 18 percent of the county. It is about 36 percent Onarga and similar soils, 18 percent Dakota soils, 14 percent Sparta and similar soils, and 32 percent minor soils (fig. 4).

The loamy, well drained Onarga soils are in nearly level areas and on gently sloping, convex ridges. Typically, the surface layer is very dark grayish brown, friable sandy loam about 18 inches thick. The subsoil is about 18 inches thick. The upper part is dark brown, friable sandy loam; the next part is dark yellowish brown, friable sandy loam; and the lower part is dark yellowish brown, very friable loamy sand. The underlying material to a depth of 60 inches or more is dark yellowish brown, loose sand.

The loamy, well drained Dakota soils are in nearly level areas and on gently sloping, convex ridges. Typically, the surface layer is very dark grayish brown, friable fine sandy loam about 9 inches thick. The subsurface layer is dark brown, friable loam about 9 inches thick. The subsoil is about 18 inches thick. The upper part is brown, friable loam; the next part is dark yellowish brown, friable clay loam; and the lower part is yellowish brown, friable sandy loam. The underlying material to a depth of 60 inches or more is yellowish brown, loose fine sand and loamy sand.

The sandy, excessively drained Sparta soils are on gently sloping, convex ridges. Typically, the surface layer is very dark grayish brown, very friable loamy sand about 9 inches thick. The subsurface layer is dark brown, very friable loamy sand about 14 inches thick. The subsoil is about 15 inches thick. The upper part is brown, very friable loamy sand, and the lower part is dark yellowish brown, very friable sand. The underlying material to a depth of 60 inches or more is loose sand. The upper part is dark yellowish brown, and the lower part is strong brown.

Of minor extent in this association are Bloomfield, Cohoctah, Gilford, Plainfield, and Ridgeville soils. The light-colored Bloomfield and Plainfield soils are on ridges. The poorly drained Cohoctah soils are on flood plains. The poorly drained Gilford and somewhat poorly drained Ridgeville soils are in low, nearly level areas below the major soils.

In most areas the major soils are used for cultivated crops. Onarga and Dakota soils are moderately suited to the commonly grown crops, and Sparta soils are

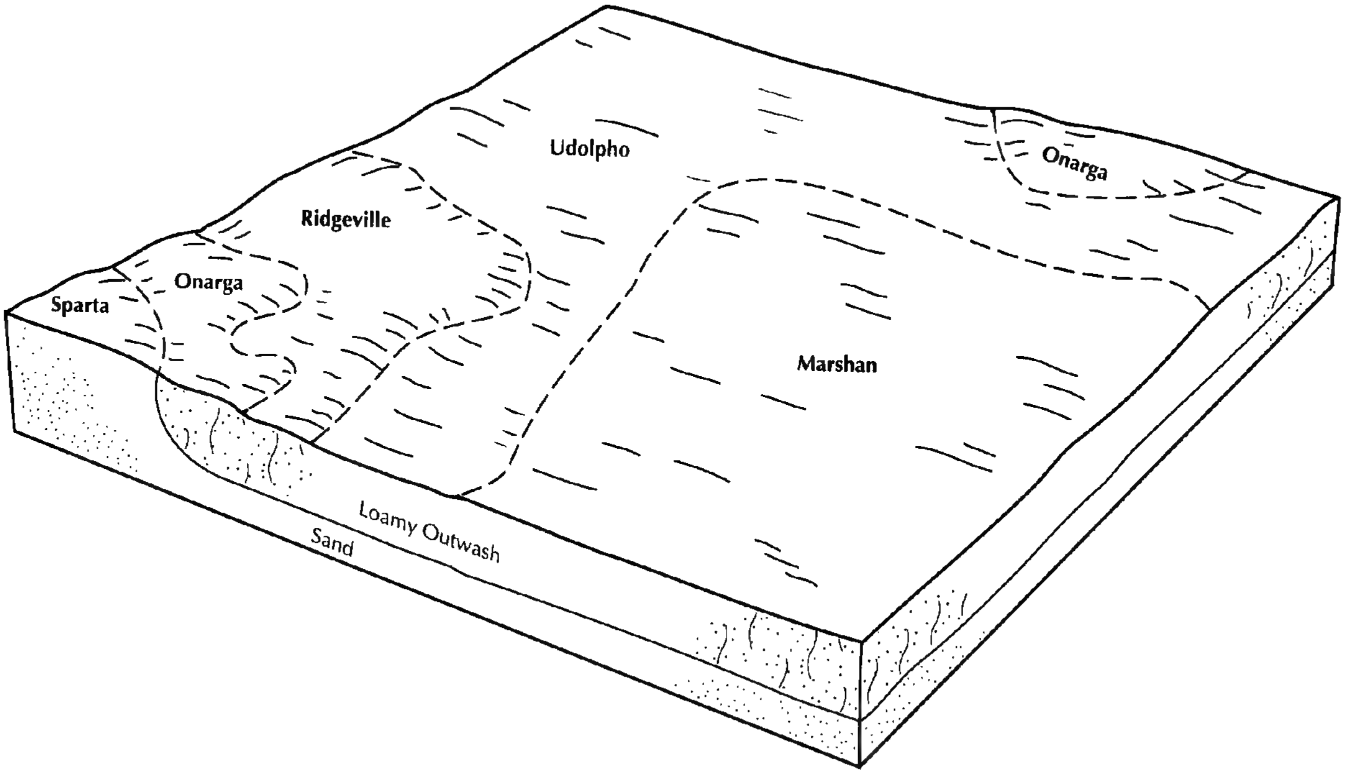

Figure 5.—Typical pattern of soils and parent material in the Marshan-Udolpho association.

poorly suited. The main management concerns are soil blowing and the available water capacity. Also, measures that control water erosion are needed in the gently sloping areas of the Onarga and Dakota soils. Generally, irrigated areas of the soils in this association are well suited to cultivated crops, but Sparta soils are only moderately suited.

This association is well suited to building site development. Because of a hazard of ground-water contamination, these soils are poorly suited to use as sites for septic tank absorption fields.

Nearly Level, Poorly Drained, Loamy and Silty Soils; on Stream Terraces

These soils formed in loamy and silty outwash. They are used primarily for cultivated crops. The seasonal high water table and ponding are the main management concerns.

4. Marshan-Udolpho Association

Nearly level, poorly drained, loamy soils that formed in outwash; on stream terraces

This association consists of soils in broad, low areas and depressions on stream terraces. Slopes range from 0 to 2 percent.

This association makes up 12 percent of the county. It is about 40 percent Marshan and similar soils, 36 percent Udolpho and similar soils, and 24 percent minor soils (fig. 5).

The Marshan soils are in broad, low areas. Typically, the surface layer is black, friable loam about 9 inches thick. The subsurface layer is black, mottled, friable loam about 6 inches thick. The subsoil is mottled, friable loam about 23 inches thick. The upper part is dark gray, and the lower part is grayish brown. The underlying material to a depth of 60 inches or more is grayish brown, loose sand.

The Udolpho soils are in depressions and low areas. Typically, the surface layer is very dark grayish brown, friable fine sandy loam about 9 inches thick. The subsurface layer is grayish brown, friable fine sandy loam about 5 inches thick. The subsoil is about 17 inches thick. It is mottled. The upper part is grayish brown, friable sandy clay loam, and the lower part is light brownish gray, friable fine sandy loam. The underlying material extends to a depth of 60 inches or more. It is mottled. The upper part is light gray and yellowish brown, loose fine sand, and the lower part is

grayish brown, stratified, loose loamy sand and sand.

Of minor extent in this association are Onarga, Ridgeville, and Sparta soils. The well drained Onarga, somewhat poorly drained Ridgeville, and excessively drained Sparta soils are on slight rises and convex ridges above the major soils.

In most areas the major soils are used for cultivated crops. These soils are moderately suited to the commonly grown crops. A seasonal high water table and ponding are management concerns. Measures that maintain or improve the drainage system and tilth are needed.

Because of the seasonal high water table, the ponding, and a hazard of ground-water contamination, these soils are poorly suited to building sites and septic tank absorption fields.

5. Selma-Harpster Association

Nearly level, poorly drained, loamy and silty soils that formed in outwash; on stream terraces

This association consists of soils in broad, low areas. Slopes range from 0 to 2 percent.

This association makes up 8 percent of the county. It is about 50 percent Selma and similar soils, 41 percent Harpster and similar soils, and 9 percent minor soils (fig. 6).

The loamy Selma soils typically have a surface layer of black, friable clay loam about 11 inches thick. The subsurface layer is very dark gray, mottled, friable clay loam about 9 inches thick. The subsoil is mottled, friable clay loam about 28 inches thick. The upper part is dark grayish brown, and the lower part is gray. The underlying material to a depth of 60 inches or more is stratified light brownish gray, very friable sand and grayish brown, very friable sandy loam.

The silty, calcareous Harpster soils typically have a surface layer of black, friable silty clay loam about 8 inches thick. The subsurface layer is black, firm silty clay loam about 7 inches thick. The subsoil is about 31 inches thick. It is mottled. The upper part is dark gray, friable silty clay loam; the next part is light olive gray, friable silt loam; and the lower part is olive gray, friable silt loam. The underlying material to a depth of 60 inches or more is olive, mottled, friable, stratified loam and sandy loam.

Of minor extent in this association are Houghton, Onarga, Palms, and Ridgeville soils. The somewhat poorly drained Ridgeville and well drained Onarga soils are on slight rises above the major soils. The organic Houghton and Palms soils are in depressions below the major soils.

Most areas of this association are used for cultivated crops. The major soils are well suited to the commonly grown crops. Ponding and a seasonal high water table are management concerns. Measures that maintain or improve the drainage system and tilth are needed.

Because of the seasonal high water table and the ponding, these soils are poorly suited to building sites and septic tank absorption fields.

Nearly Level to Sloping, Well Drained, Somewhat Poorly Drained, and Poorly Drained, Silty Soils; on Uplands and Stream Terraces

These soils formed in loess or in loess or silty material and the underlying loamy and sandy material. They are used primarily for cultivated crops. Water erosion and wetness are the main management concerns.

6. Elburn-Plano-Thorp Association

Nearly level and gently sloping, well drained, somewhat poorly drained, and poorly drained soils that formed in loess or silty material and the underlying stratified outwash; on stream terraces

This association consists of soils in nearly level areas and on gently sloping stream terraces. Slopes range from 0 to 5 percent.

This association makes up 5 percent of the county. It is about 27 percent Elburn soils, 23 percent Plano and similar soils, 21 percent Thorp and similar soils, and 29 percent minor soils (fig. 7).

The somewhat poorly drained Elburn soils are in broad, nearly level areas. Typically, the surface layer is very dark gray, friable silt loam about 19 inches thick. The subsoil is about 36 inches thick. In sequence downward, it is dark grayish brown, friable silty clay loam; brown, mottled, friable silty clay loam; light brownish gray, mottled, friable silty clay loam; and mottled light brownish gray and yellowish brown, friable, stratified silt loam, fine sandy loam, and loamy fine sand. The underlying material to a depth of 60 inches or more is mottled light brownish gray and yellowish brown, friable, stratified silt loam, loamy fine sand, and fine sandy loam.

The well drained Plano soils are on nearly level rises and gently sloping ridges. Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is very dark gray, friable silt loam about 6 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is dark brown, friable silt loam and silty clay loam; the next part is dark yellowish brown, friable silty clay loam; and the lower part is dark yellowish brown, friable loam.

The poorly drained, nearly level Thorp soils are in depressions and drainageways. Typically, the surface layer is very dark gray, friable silt loam about 6 inches

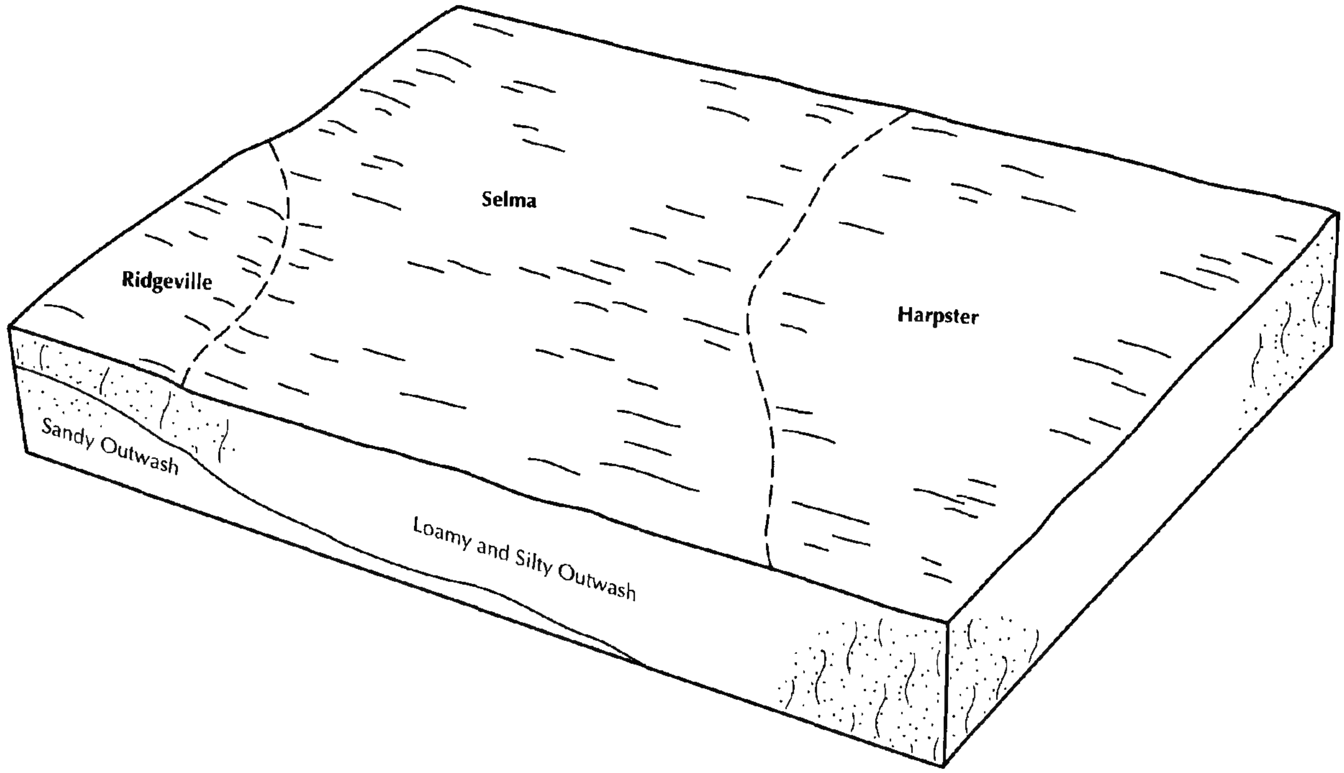

Figure 6.—Typical pattern of soils and parent material in the Selma-Harpster association.

thick. The subsurface layer is friable silt loam about 10 inches thick. The upper part is very dark grayish brown, and the lower part is dark grayish brown and mottled. The subsoil is about 37 inches thick. It is mottled. In sequence downward, it is dark grayish brown, friable silty clay loam; grayish brown, firm silty clay loam; light brownish gray, firm silty clay loam; light brownish gray, friable silt loam; and dark grayish brown, very friable, stratified fine sandy loam and loamy fine sand. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable silt loam.

Of minor extent in this association are Dakota, Drummer, Onarga, and Pillot soils. Dakota, Onarga, and Pillot soils are on ridges. Dakota and Onarga soils are loamy. Pillot soils have more sand and less clay in the lower part of the profile than the major soils. The poorly drained Drummer soils are in broad, low areas.

In most areas the major soils are used for cultivated crops. If properly managed, these soils are well suited to the commonly grown crops. Water erosion, a seasonal high water table, and ponding are the main management concerns. Measures that maintain or improve the drainage system and tilth and that control erosion are needed.

The well drained areas of this association are only moderately suited to building site development because of the shrink-swell potential. They are well suited to septic tank absorption fields. The somewhat poorly drained and poorly drained areas are poorly suited to building site development and septic tank absorption fields because of the seasonal high water table, the shrink-swell potential, and the ponding.

7. Broadwell-Edgington-Pillot Association

Nearly level to sloping, well drained and poorly drained soils that formed in loess or in loess and the underlying loamy and sandy material; on uplands

This association consists of soils on rises, ridges, and side slopes and in depressions and drainageways. Slopes range from 0 to 10 percent.

This association makes up 10 percent of the county. It is about 32 percent Broadwell soils, 18 percent Edgington soils, 16 percent Pillot and similar soils, and 34 percent minor soils (fig. 8).

The well drained Broadwell soils are on nearly level ridges and gently sloping and sloping ridges and side slopes. Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is dark brown, friable silt loam about 5

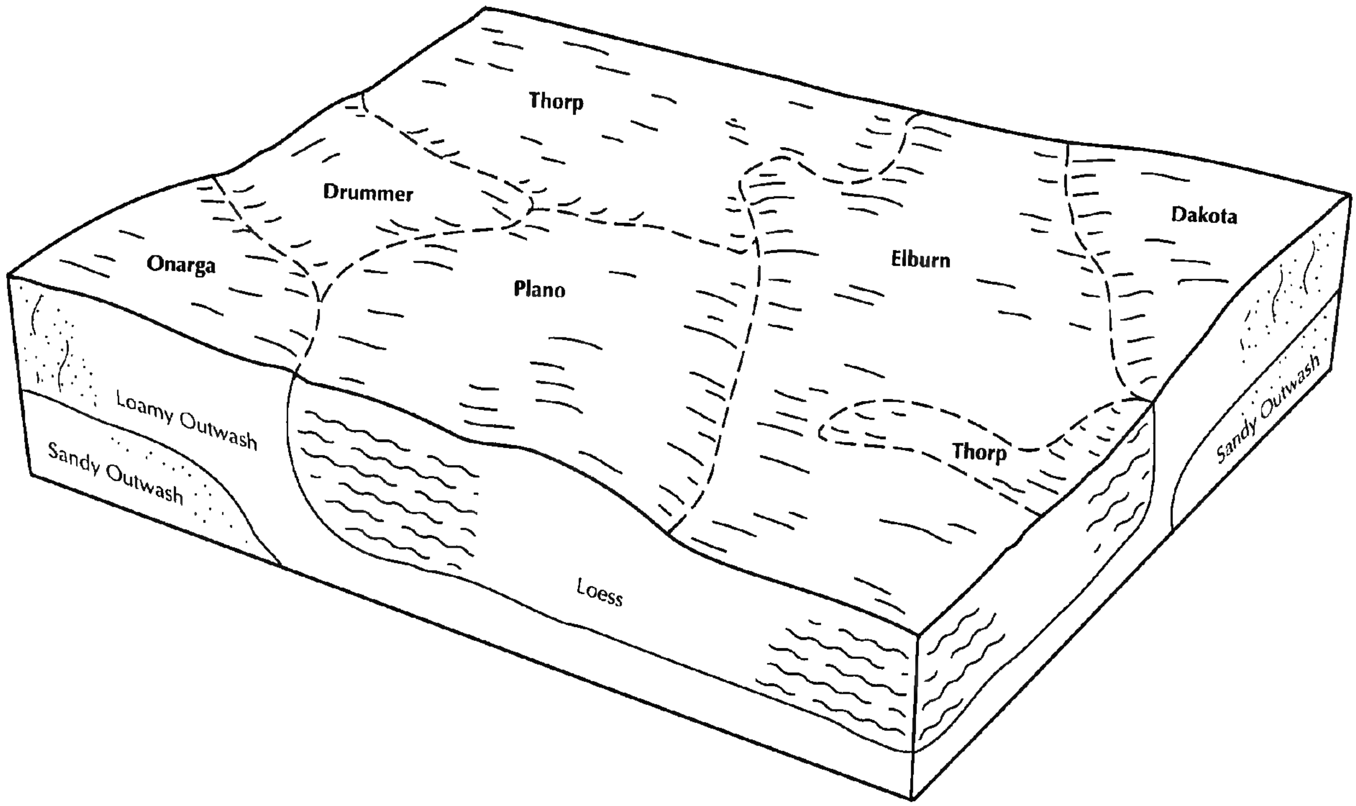

Figure 7.—Typical pattern of soils and parent material in the Elburn-Plano-Thorp association.

inches thick. The subsoil extends to a depth of 60 inches or more. In sequence downward, it is dark brown, friable silty clay loam; dark yellowish brown, friable silty clay loam; yellowish brown, friable loam; and yellowish brown, very friable loamy fine sand.

The poorly drained Edgington soils are in depressions and drainageways. Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is friable silt loam about 16 inches thick. The upper part is very dark gray, the next part is dark grayish brown and mottled, and the lower part is grayish brown and mottled. The subsoil extends to a depth of 60 inches or more. It is mottled. In sequence downward, it is dark grayish brown, friable silty clay loam; grayish brown, firm silty clay loam; light brownish gray, firm silty clay loam; and light brownish gray, friable silt loam.

The well drained Pillot soils are on nearly level rises and gently sloping and sloping ridges and side slopes. Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is very dark grayish brown and dark brown, friable silt loam about 5 inches thick. The subsoil is about 24 inches thick. The upper part is dark brown and dark yellowish brown, friable silty clay loam, and the lower part is dark yellowish brown, friable loam. The underlying material to a depth of 60 inches or more is yellowish brown, loose loamy fine sand and fine sand.

Of minor extent in this association are Ade, Lawndale, Onarga, and Sparta soils. The sandy Ade and Sparta soils and the loamy Onarga soils are on ridges and side slopes. The somewhat poorly drained Lawndale soils are in broad areas.

In most areas the major soils are used for cultivated crops. They are well suited to the commonly grown crops. In the gently sloping and sloping areas, water erosion is the main management concern. In the depressional areas, a seasonal high water table and ponding are the main management concerns.

The well drained areas of this association are only moderately suited to building site development because of the shrink-swell potential. The Broadwell soils are well suited to use as sites for septic tank absorption fields, but the Pillot soils are poorly suited because of a hazard of ground-water contamination. The poorly drained areas are poorly suited to building site development and septic tank absorption fields because

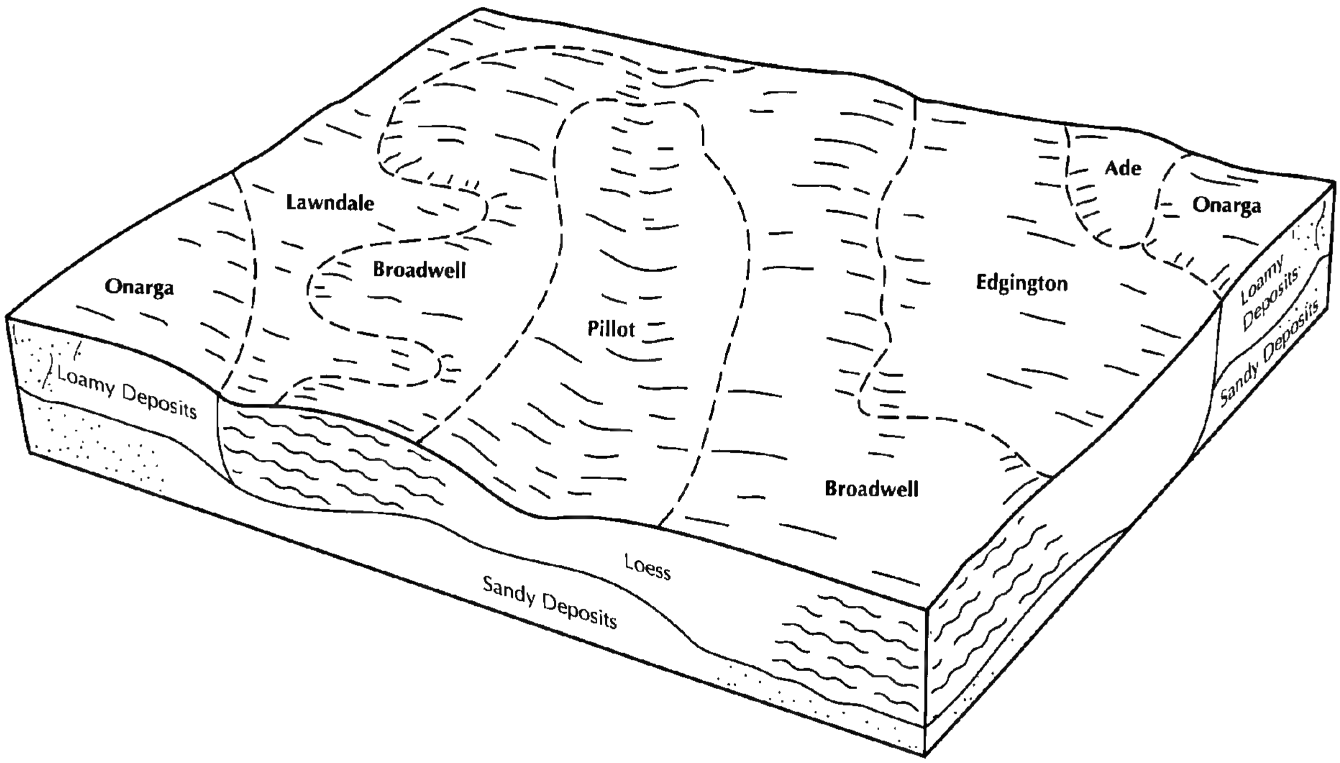

Figure 8.—Typical pattern of soils and parent material in the Broadwell-Edgington-Pillot association.

of the ponding, the shrink-swell potential, and restricted permeability.

8. Tama-Ipava Association

Nearly level to sloping, well drained and somewhat poorly drained soils that formed in loess; on uplands and stream terraces

This association consists of soils on ridges and side slopes. Slopes range from 0 to 10 percent.

This association makes up 6 percent of the county. It is about 55 percent Tama soils, 15 percent Ipava soils, and 30 percent minor soils (fig. 9).

The well drained Tama soils are on nearly level ridges and gently sloping and sloping ridges and side slopes. Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsoil is about 40 inches thick. The upper part is dark brown, friable silt loam; the next part is dark yellowish brown, friable silty clay loam; and the lower part is dark yellowish brown, friable silt loam. The underlying material to a depth of 60 inches or more is yellowish brown, friable silt loam.

The somewhat poorly drained Ipava soils are on broad, nearly level ridges. Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 12 inches thick. The subsoil is mottled, friable silty clay loam about 24 inches thick. The upper part is dark brown, and the lower part is yellowish brown. The underlying material to a depth of 60 inches or more is yellowish brown, mottled, friable silt loam.

Of minor extent in this association are Bold, Edgington, Hartsburg, Sable, and Tallula soils. Bold and Tallula soils are on strongly sloping, convex side slopes. The poorly drained Edgington, Hartsburg, and Sable soils are in drainageways and low areas below the major soils.

In most areas the major soils are used for cultivated crops. They are well suited to cultivated crops. Water erosion is the major management concern in the gently sloping and sloping areas. Measures that control erosion and maintain tilth are needed.

Tama soils are only moderately suited to building site development because of the shrink-swell potential. They are well suited to septic tank absorption fields. Ipava soils are poorly suited to building site development and

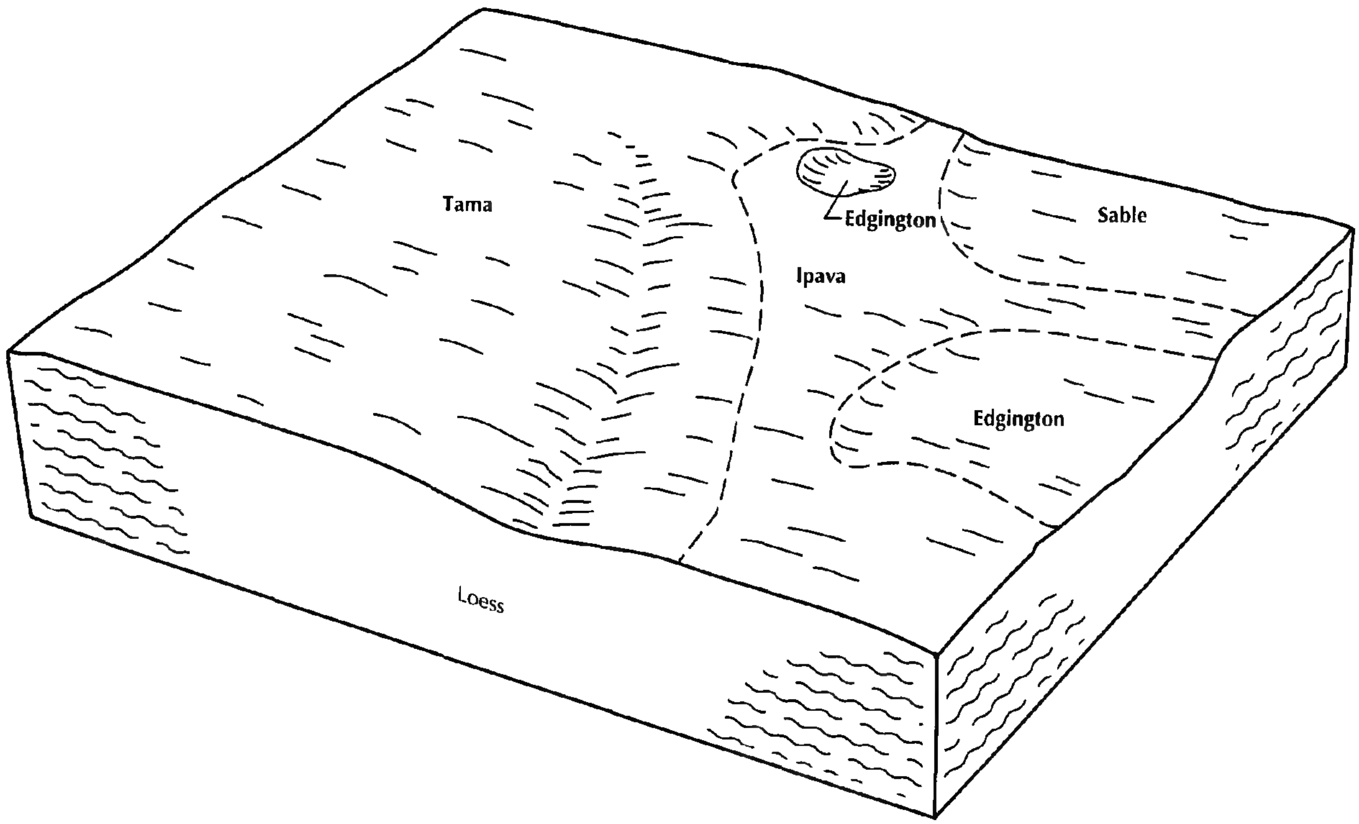

Figure 9.—Typical pattern of soils and parent material in the Tama-Ipava association.

septic tank absorption fields because of a seasonal high water table, the shrink-swell potential, and restricted permeability.

Nearly Level to Steep, Well Drained and Somewhat Excessively Drained, Silty, Loamy, and Sandy Soils; on Uplands

These soils formed in loess or in loamy or sandy eolian deposits. The less sloping areas are used primarily for cultivated crops, and the more sloping areas are used as pasture or woodland. Water erosion, soil blowing, and droughtiness are the main management concerns.

9. Fayette-Alvin-Bloomfield Association

Nearly level to steep, well drained and somewhat excessively drained, silty, loamy, and sandy soils that formed in loess or in loamy or sandy eolian deposits; on uplands

This association consists of soils on ridges and side slopes. Slopes range from 0 to 30 percent.

This association makes up 4 percent of the county. It is about 32 percent Fayette and similar soils, 27 percent Alvin soils, 17 percent Bloomfield and similar soils, and 24 percent minor soils (fig. 10).

The silty, well drained Fayette soils are on gently sloping to steep ridges and side slopes. Typically, the surface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsurface layer is dark brown, friable silt loam about 5 inches thick. The subsoil is about 36 inches thick. The upper part is dark yellowish brown, friable silt loam; the next part is dark yellowish brown, friable silty clay loam; and the lower part is yellowish brown, friable silt loam. The underlying material to a depth of 60 inches or more is yellowish brown, friable silt loam.

The loamy, well drained Alvin soils are on nearly level rises and gently sloping to steep ridges and side slopes. Typically, the surface layer is dark brown, friable fine sandy loam about 5 inches thick. The subsurface layer is yellowish brown, friable fine sandy loam about 13 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is yellowish brown, friable fine sandy loam; the next part is yellowish brown, friable loam; and the lower part is alternating bands of

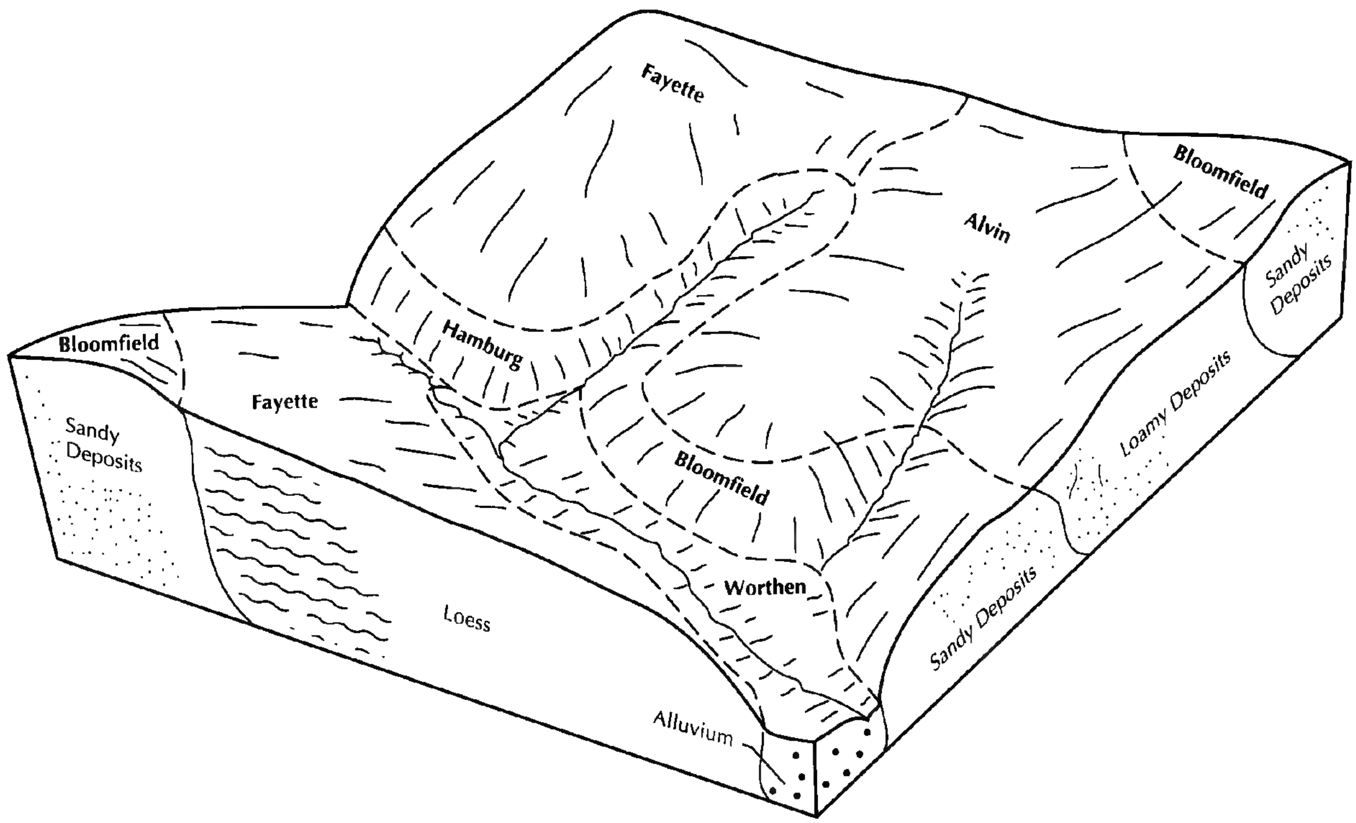

Figure 10.—Typical pattern of soils and parent material in the Fayette-Alvin-Bloomfield association.

strong brown, very friable loamy fine sand and dark brown, friable fine sandy loam.

The sandy, somewhat excessively drained Bloomfield soils are on gently sloping to strongly sloping ridges and side slopes. Typically, the surface layer is mixed dark yellowish brown and dark brown, very friable sand about 8 inches thick. The subsurface layer is loose sand about 37 inches thick. The upper part is dark brown, and the lower part is dark yellowish brown. Below this to a depth of 60 inches or more are alternating bands of dark brown, very friable loamy sand and yellowish brown, loose sand.

Of minor extent in this association are Hamburg, Raddle, Tama, Timula, and Worthen soils. Hamburg soils are calcareous throughout. They are on side slopes and ridges. The dark Raddle and Worthen soils are on upland foot slopes and stream terraces below the major soils. The dark Tama soils are on ridges. Timula soils are shallower to carbonates than the major soils. They are on side slopes.

The less sloping areas of this association are used mainly for cultivated crops, and the more sloping areas are used as woodland or pasture. Fayette and Alvin soils generally are moderately suited to cultivated crops. Bloomfield soils are poorly suited, and soils in the steep areas are unsuited. The main management concerns are water erosion and soil blowing. This association is moderately well suited to pasture and hay. It is moderately suited to woodland.

The less sloping areas of this association are well suited or moderately suited to building site development. The steep areas are unsuited. The gently sloping and sloping areas of Alvin and Fayette soils are well suited to septic tank absorption fields. The strongly sloping areas are moderately suited, and the steep areas are unsuited. Bloomfield soils are poorly suited to septic tank absorption fields because of a hazard of ground-water contamination.

Nearly Level, Poorly Drained and Somewhat Poorly Drained, Silty Soils; on Flood Plains

These soils formed in alluvium. They are used primarily for cultivated crops. Flooding and a seasonal high water table are the main management concerns.

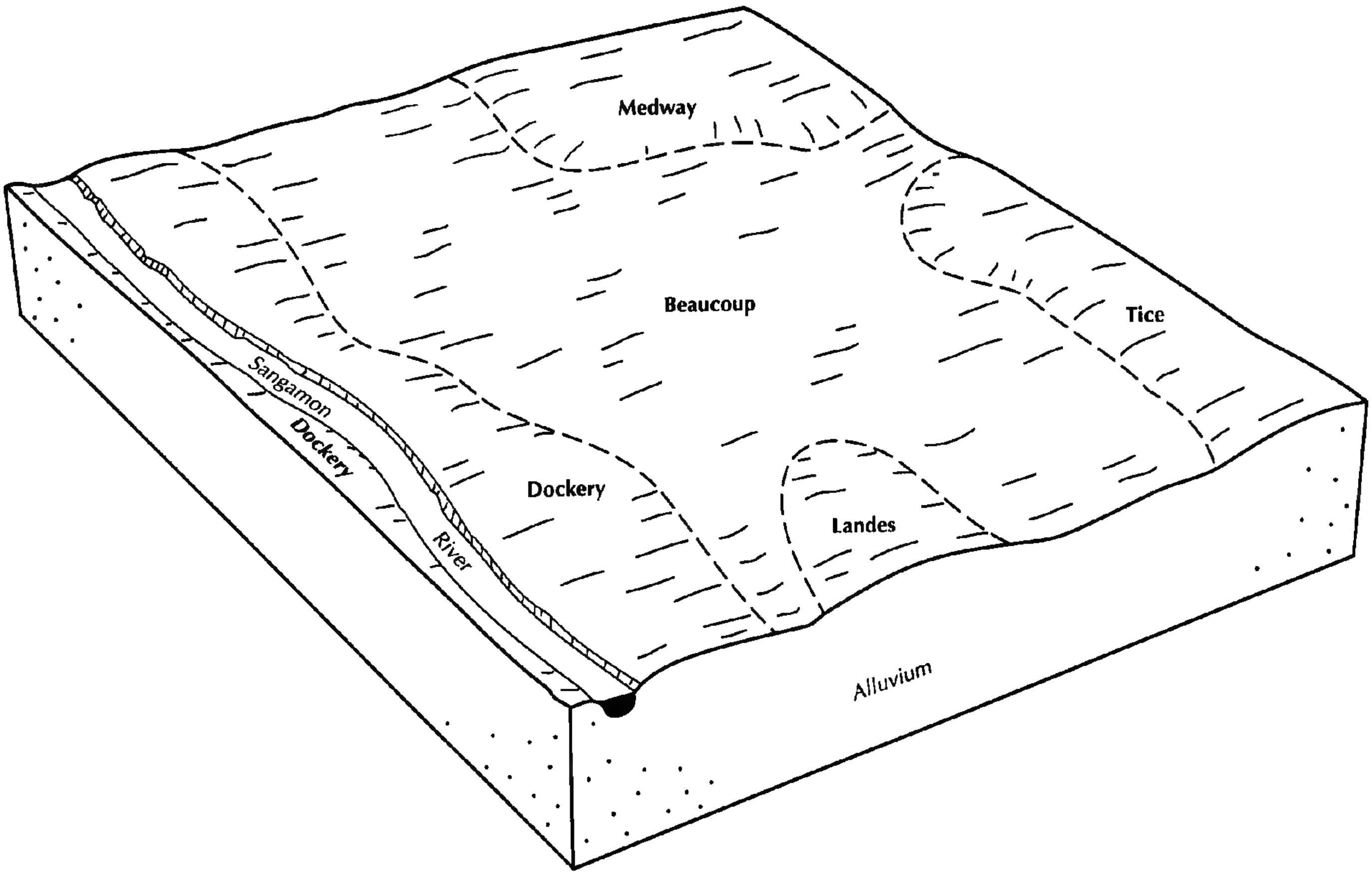

Figure 11.—Typical pattern of soils and parent material in the Beaucoup-Dockery association.

10. Beaucoup-Dockery Association

Nearly level, poorly drained and somewhat poorly drained soils that formed in alluvium; on flood plains

This association consists of soils on flood plains along rivers. Areas protected by levees are occasionally flooded, and unprotected areas are frequently flooded. Slopes range from 0 to 2 percent.

This association makes up 11 percent of the county. It is about 54 percent Beaucoup and similar soils, 23 percent Dockery soils, and 23 percent minor soils (fig. 11).

The poorly drained Beaucoup soils are in broad areas. Typically, the surface layer is very dark gray, friable silty clay loam about 10 inches thick. The subsurface layer is very dark gray, mottled, friable silty clay loam about 7 inches thick. The subsoil is mottled, friable silty clay loam about 28 inches thick. The upper part is dark gray, the next part is olive gray, and the lower part is light olive gray and yellowish brown. The underlying material to a depth of 60 inches or more is light olive gray, mottled, friable silty clay loam.

The somewhat poorly drained Dockery soils are in broad areas. Typically, the surface layer is mixed very dark grayish brown and dark grayish brown, friable silty clay loam about 9 inches thick. The underlying material to a depth of 60 inches or more is stratified dark grayish brown, grayish brown, and very dark grayish brown, friable silt loam and silty clay loam.

Of minor extent in this association are Arenzville, Cohoctah, Landes, Medway, and Tice soils. The moderately well drained Arenzville and Medway soils, the well drained Landes soils, and the somewhat poorly drained Tice soils are on nearly level ridges above the major soils. Cohoctah soils are loamy. They are in low areas.

Most areas of this association that are protected from flooding are used for cultivated crops. Unprotected areas are wooded or are used for cultivated crops. Occasionally flooded areas are well suited to the commonly grown crops. Frequently flooded areas generally are unsuited, poorly suited, or moderately

suited. A seasonal high water table and flooding are the main management concerns. Measures that maintain or improve tilth and the drainage and levee systems are needed.

Because of the flooding and the seasonal high water table, this association is unsuited to building site development and septic tank absorption fields.

Broad Land Use Considerations

Most areas in Mason County are used for cultivated crops, dominantly corn, soybeans, and wheat. Some areas are used as pasture or woodland or for specialty crops, urban development, recreational development, or wildlife habitat. The suitability of the soils for these uses differs significantly.

Erosion is the main hazard on the cropland in associations 7, 8, and 9. Droughtiness and soil blowing are the main hazards in associations 1, 2, and 3. Wetness is the main limitation in associations 4, 5, 6, and 10. Soils in associations 4, 5, and 10 also are subject to ponding or flooding, which causes crop damage.

Most of the small acreage that is used as pasture or woodland is in associations 1, 9, and 10. The soils in all of the associations are suitable for grasses and legumes. The droughty soils in association 1 are well suited to conifers, but they are poorly suited to hardwoods. The slope is a moderate or severe limitation on some of the soils. Using special equipment helps to overcome this limitation.

The potential for wildlife habitat is good throughout most of the county. Some of the soils in associations 3, 4, 6, 7, 8, 9, and 10 have good potential for openland and woodland wildlife habitat. The nearly level, poorly drained soils in associations 4, 5, 6, 7, and 10 have fair to good potential for wetland wildlife habitat.

The potential for recreational development ranges from poor to good, depending on the intensity of expected use. Associations 3, 6, 7, 8, and 9 have good potential for intensive recreational uses, and association 2 has fair potential. The more sloping areas in associations 3, 7, 8, and 9 have a more limited potential for intensive recreational development. The soils in all of the associations are suited to paths and trails for hiking or horseback riding. Small areas that are suitable for intensive uses, such as playgrounds and campsites, are available in the associations that generally have poor potential for these uses.

A few areas in the county are developed or built up for urban uses. Generally, soils in associations 1, 2, 3, 7, and 8 are the best suited to use as sites for buildings. The shrink-swell potential, a seasonal high water table, and the slope are management concerns in the other associations. Association 10 is generally unsuited to urban development because of the hazard of flooding.

Private sewage disposal systems are needed throughout the county. The well drained soils in associations 6, 7, 8, and 9 are well suited to use as sites for septic tank absorption fields. Ground-water contamination is a hazard in associations 1, 2, 3, and 4, and a seasonal high water table is a limitation in associations 4, 5, 6, and 10.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under the heading "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Plainfield sand, 1 to 7 percent slopes, is a phase of the Plainfield series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Tallula-Bold complex, 7 to 15 percent slopes, eroded, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The "Glossary" defines many of the terms used in describing the soils.

The names of the map units identified on the detailed soil maps in this survey do not fully agree with those identified on the detailed soil maps in the published soil surveys of adjacent Cass, Logan, and Menard Counties. Differences are the result of variations in the extent of the soils in the survey areas. They do not significantly affect the use of the maps for detailed planning of land uses.

Soil Descriptions

30G—Hamburg silt loam, 20 to 60 percent slopes. This very steep, somewhat excessively drained, calcareous soil is on upland side slopes near major streams. Individual areas are linear or irregular in shape and range from 3 to 280 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 6 inches thick. The subsurface layer is yellowish brown, friable silt loam about 7 inches thick. The underlying material to a depth of 60 inches or more is silt. The upper part is yellowish brown and friable, and the lower part is light yellowish brown and friable. In some areas the soil contains more clay throughout. In other areas the upper part of the profile is not calcareous.

Included with this soil in mapping are small areas of the moderately well drained Arenzville and excessively drained, sandy Plainfield soils. Arenzville soils are on flood plains. Plainfield soils are in lower positions on the landscape than those of the Hamburg soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Hamburg soil at a

moderate rate. Surface runoff is rapid. Available water capacity is very high. The content of organic matter is low.

Most areas are used as woodland. This soil is moderately suited to woodland. Because of the slope, the soil is unsuited to cultivated crops and to use as a site for dwellings or for septic tank absorption fields.

In areas used as woodland, the slope increases the erosion hazard and limits the use of equipment. The seedling mortality rate is high. The main erosion-control practices include placing logging roads and skid trails on or near the contour, skidding logs or trees uphill with a cable and winch in the steeper areas, establishing grass firebreaks, and seeding bare logging areas to grass or to a grass-legume mixture. The use of machinery is limited to periods when the soil is firm. Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings reduce the seedling mortality rate. Protection from fire prevents injury to trees and maintains the leaf mulch.

The land capability classification is VIIe.

36A—Tama silt loam, 0 to 2 percent slopes. This nearly level, well drained soil is on uplands and stream terraces. Individual areas are irregular in shape and range from 3 to 1,400 acres in size.

Typically, the surface soil is very dark grayish brown, friable silt loam about 15 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is dark brown, friable silt loam and silty clay loam, and the lower part is dark yellowish brown, friable silty clay loam and silt loam. In places the seasonal high water table is at a depth of 4 to 6 feet.

Included with this soil in mapping are small areas of the poorly drained Edgington and somewhat poorly drained Ipava soils. Edgington soils are in depressions below the Tama soil. Ipava soils are in lower positions on the landscape than those of the Tama soil. Included soils make up 1 to 5 percent of the unit.

Water and air move through the Tama soil at a moderate rate. Surface runoff is slow. Available water capacity is very high. The content of organic matter is moderate. The shrink-swell potential also is moderate.

Most areas are cultivated, but some areas are used for pasture and hay. This soil is well suited to cultivated crops and to pasture and hay. It is moderately suited to use as a site for dwellings and well suited to septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain or for pasture and hay. Returning crop residue to the soil helps to maintain tilth and fertility. Including grasses and legumes in the cropping sequence also helps to maintain tilth. Selection of suitable species for planting, proper stocking rates, applications of fertilizer and lime, and restricted use during wet periods help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is I.

36B—Tama silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on ridges and side slopes in the uplands and on stream terraces. Individual areas are irregular in shape or linear and range from 3 to 600 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsoil is about 40 inches thick. The upper part is dark brown, friable silt loam; the next part is dark yellowish brown, friable silty clay loam; and the lower part is dark yellowish brown, friable silt loam. The underlying material to a depth of 60 inches or more is yellowish brown, friable silt loam. In some areas the surface layer is thinner. In other areas the soil is calcareous within a depth of 40 inches. In a few places the slope is less than 2 percent or more than 5 percent. In a few areas the underlying material is sand.

Included with this soil in mapping are small areas of the poorly drained Edgington and somewhat poorly drained Ipava soils. Edgington soils are in depressions and drainageways below the Tama soil. Ipava soils are in lower positions on the landscape than those of the Tama soil. Included soils make up 1 to 5 percent of the unit.

Water and air move through the Tama soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is very high. The content of organic matter is moderate. The shrink-swell potential also is moderate.

Most areas are cultivated, but some areas are used for pasture and hay. This soil is well suited to cultivated crops and to pasture and hay. It is moderately suited to use as a site for dwellings. It is well suited to septic tank absorption fields.

In areas used for corn, soybeans, and small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these helps to control erosion. Returning crop residue to the soil helps to maintain tilth and fertility (fig. 12).

If this soil is used for pasture or hay, overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Proper stocking rates, pasture rotation, and timely

Figure 12.—A protective cover of crop residue helps to control erosion and maintain tilth and fertility in this area of Tama silt loam, 2 to 5 percent slopes.

deferment of grazing help to control erosion. Applications of fertilizer and lime help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

36C2—Tama silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on upland side slopes and ridges. Individual areas are linear or irregular in shape and range from 3 to 45 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. It contains some dark brown subsoil material. The subsoil is about 41 inches thick. The upper part is dark brown, friable silty clay loam; the next part is dark yellowish brown, friable silty clay loam; and the lower part is dark yellowish brown, friable silt loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable silt loam. In some areas the soil is calcareous within a depth of 40 inches. In a few areas the surface layer is silty clay loam and is lighter colored. In some places the underlying material is sand.

Included with this soil in mapping are small areas of the calcareous Bold and poorly drained Edgington soils. Bold soils are on side slopes below the Tama soil. Edgington soils are in drainageways. Included soils make up 1 to 5 percent of the unit.

Water and air move through the Tama soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is very high. The content of organic matter is moderate. The shrink-swell potential also is moderate.

Most areas are cultivated, but some areas are used for pasture and hay. This soil is moderately suited to

cultivated crops. It is well suited to pasture and hay. It is moderately suited to use as a site for dwellings and well suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, a crop rotation in which close-growing grasses and legumes are grown for 1 year or more, contour farming, terraces, or a combination of these helps to control erosion and thus maintain the productivity of the soil. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer and lime are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

37—Worthen silt loam. This nearly level, well drained soil is on stream terraces. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is very dark grayish brown and dark brown, friable silt loam about 19 inches thick. The subsoil to a depth of 60 inches or more is dark brown and brown, friable silt loam. In some areas the subsurface layer is thinner. In other areas the subsoil contains more clay. In some places the seasonal high water table is at a depth of 4 to 6 feet.

Included with this soil in mapping are small areas of somewhat poorly drained soils. These soils are in slightly lower positions on the landscape than those of the Worthen soil. They make up 1 to 5 percent of the unit.

Water and air move through the Worthen soil at a moderate rate. Surface runoff is slow. Available water capacity is very high. The content of organic matter is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops. It is well suited to use as a site for dwellings or for septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. Returning crop residue to the soil helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is I.

43—Ipava silt loam. This nearly level, somewhat poorly drained soil is on uplands. Individual areas are irregular in shape and range from 3 to 180 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 12 inches thick. The subsoil is mottled, friable silty clay loam about 24 inches thick. The upper part is dark brown, and the lower part is yellowish brown. The underlying material to a depth of 60 inches or more is yellowish brown, mottled, friable silt loam. In some areas the subsoil contains less clay.

Included with this soil in mapping are small areas of the poorly drained Edgington, Hartsburg, and Sable soils and the well drained Tama soils. Edgington, Hartsburg, and Sable soils are in drainageways and depressions below the Ipava soil. Tama soils are on slight rises above the Ipava soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Ipava soil at a moderately slow rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet during spring. Available water capacity is very high. The content of organic matter is high. The shrink-swell potential also is high.

Most areas are cultivated. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. The seasonal high water table can delay planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. A system of conservation tillage that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderately slow permeability are limitations. Subsurface tile drains

lower the water table. Grading and land shaping help to remove surface water. Increasing the size of the absorption field or replacing the soil with more permeable material helps to overcome the restricted permeability.

The land capability classification is I.

49—Watseka loamy sand. This nearly level, somewhat poorly drained soil is on stream terraces. Individual areas are irregular in shape and range from 3 to 50 acres in size.

Typically, the surface soil is very dark grayish brown, very friable loamy sand about 16 inches thick. The subsoil is about 24 inches thick. The upper part is dark grayish brown, very friable loamy sand; the next part is grayish brown, mottled, very friable loamy sand; and the lower part is light brownish gray, mottled, very friable loamy sand and sand. The underlying material to a depth of 60 inches or more is brown, mottled, loose sand. In some areas the soil contains more clay. In other areas the surface soil is thinner.

Included with this soil in mapping are small areas of the somewhat excessively drained Ade soils, the poorly drained Gilford, Maumee, and Udolpho soils, and the excessively drained Sparta soils. Ade and Sparta soils are in higher positions on the landscape than those of the Watseka soil. Gilford, Maumee, and Udolpho soils are in low areas below the Watseka soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Watseka soil at a rapid rate. Surface runoff is very slow. The seasonal high water table is at a depth of 1 to 3 feet during spring. Available water capacity is low. The content of organic matter is moderately low.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

If this soil is used for corn, soybeans, and small grain, soil blowing, the low available water capacity, and low fertility are management concerns. Using a system of conservation tillage that leaves crop residue on the surface after planting and establishing field windbreaks help to control soil blowing and conserve soil moisture. Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and improves fertility. An irrigation system can supply additional water.

If this soil is used as a site for dwellings or septic tank absorption fields, the seasonal high water table is a limitation. Installing subsurface tile drains helps to overcome this limitation. A poor filtering capacity is an additional limitation in areas used for septic tank absorption fields. The soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the contamination of ground water. Filling or mounding with suitable material can increase the filtering capacity of the field.

The land capability classification is IIIs.

53B—Bloomfield sand, 1 to 7 percent slopes. This gently sloping, somewhat excessively drained soil is on dunes, stream terraces, and uplands. Individual areas are irregular in shape and range from 3 to 650 acres in size.

Typically, the surface layer is mixed dark yellowish brown and dark brown, very friable sand about 8 inches thick. The subsurface layer is loose sand about 37 inches thick. The upper part is dark brown, and the lower part is dark yellowish brown. Below this to a depth of 60 inches or more are alternating bands of dark brown, very friable loamy sand and dark yellowish brown, loose sand. In some areas the lower part of the profile contains less clay. In other areas the surface layer and the upper part of the subsurface layer are darker.

Included with this soil in mapping are small areas of the well drained Alvin and poorly drained Udolpho soils. Alvin soils are in landscape positions similar to those of the Bloomfield soil. Udolpho soils are in depressions below the Bloomfield soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Bloomfield soil at a rapid rate. Surface runoff is slow. Available water capacity is low. The content of organic matter also is low.

Most areas are cultivated. Some areas are used for pasture and hay or for specialty crops, such as melons, pumpkins, and cantaloupes. Other areas are wooded. This soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay. If irrigated, it is moderately suited to cultivated crops. It is moderately well suited to woodland and well suited to specialty crops. It is well suited to use as a site for dwellings. It is poorly suited to septic tank absorption fields.

Soil blowing, low fertility, and the low available water capacity are management concerns in areas used for corn, soybeans, or small grain. Using a system of conservation tillage that leaves crop residue on the surface after planting and establishing field windbreaks help to control soil blowing and conserve soil moisture. Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and improves fertility.

Soil blowing, low fertility, and the low available water capacity are management concerns in areas used for pasture and hay. Planting drought-tolerant grasses and legumes helps to maintain or improve forage stands. Frequent applications of small amounts of fertilizer help

to prevent excessive loss of plant nutrients through leaching. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition and help to control soil blowing.

If this soil is used as woodland, seedling mortality caused by the low available water capacity is a management concern. Planting species that can tolerate droughty conditions reduces the seedling mortality rate. Using large seedlings or eliminating all vegetation within 2 feet of the existing or planted seedlings also can reduce the seedling mortality rate. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

In areas used for specialty crops, soil blowing is a hazard. Field windbreaks and border strips reduce this hazard.

If this soil is used as a site for septic tank absorption fields, a poor filtering capacity is a limitation. The soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the contamination of ground water. Filling or mounding with suitable material can increase the filtering capacity of the field.

The land capability classification is IIIs.

53D—Bloomfield sand, 7 to 15 percent slopes. This strongly sloping, somewhat excessively drained soil is on dunes, stream terraces, and uplands. Individual areas are irregular in shape or linear and range from 3 to 170 acres in size.

Typically, the surface layer is dark brown, very friable sand about 11 inches thick. The subsurface layer is loose sand about 24 inches thick. The upper part is dark yellowish brown, and the lower part is yellowish brown. Below this to a depth of 60 inches or more are alternating bands of brown, very friable loamy sand and yellowish brown, loose sand. In some areas the lower part of the profile contains less clay. In other areas the surface layer and the upper part of the subsurface layer are darker.

Included with this soil in mapping are small areas of the well drained Alvin soils. These soils are in landscape positions similar to those of the Bloomfield soil. They make up 1 to 5 percent of the unit.

Water and air move through the Bloomfield soil at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is low. The content of organic matter also is low.

Most areas are wooded or are cultivated, but some areas are used for pasture and hay. This soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay. It is moderately well suited to woodland. If irrigated, it is moderately suited to cultivated crops. It is moderately suited to use as a site for dwellings. It is poorly suited to septic tank absorption fields.

Soil blowing, water erosion, the low available water capacity, and low fertility are management concerns in areas used for corn, soybeans, or small grain. Using a system of conservation tillage that leaves crop residue on the surface after planting and establishing field windbreaks help to control water erosion and soil blowing and conserve soil moisture. Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and improves fertility.

In areas used for pasture and hay, the low available water capacity, low fertility, soil blowing, and water erosion are management concerns. Planting drought-tolerant grasses and legumes helps to maintain or improve forage stands. Frequent applications of small amounts of fertilizer help to prevent excessive loss of plant nutrients through leaching. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition and help to control water erosion and soil blowing.

If this soil is used as woodland, seedling mortality caused by the low available water capacity is a management concern. Planting species that can tolerate droughty conditions, eliminating all vegetation within 2 feet of the existing or planted seedlings, and using large seedlings reduce the seedling mortality rate. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

If this soil is used as a site for dwellings, the slope is a limitation. Cutting, filling, and land shaping help to overcome this limitation.

If this soil is used as a site for septic tank absorption fields, the slope and a poor filtering capacity are limitations. The soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the contamination of ground water. Filling or mounding with suitable material can increase the filtering capacity of the field.

The land capability classification is IVe.

54B—Plainfield sand, 1 to 7 percent slopes. This gently sloping, excessively drained soil is on dunes, stream terraces, and uplands. Individual areas are irregular in shape and range from 3 to 1,000 acres in size.

Typically, the surface layer is dark brown, very friable sand about 9 inches thick. The subsoil is very friable sand about 22 inches thick. The upper part is dark yellowish brown, and the lower part is yellowish brown.

Figure 13.—Soil blowing in an area of Plainfield sand, 1 to 7 percent slopes.

The underlying material to a depth of 60 inches or more is yellowish brown, loose sand. In places the surface layer is darker and thicker. In some areas the lower part of the subsoil contains more clay. In other areas the upper part of the profile is fine sand.

Included with this soil in mapping are small areas of the well drained Alvin, poorly drained Udolpho, and somewhat poorly drained Watseka soils. Alvin soils are in landscape positions similar to those of the Plainfield soil. Udolpho soils are in depressions below the Plainfield soil. Watseka soils are in lower positions on the landscape than those of the Plainfield soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Plainfield soil at a rapid rate. Surface runoff is slow. Available water capacity is low. The content of organic matter also is low.

Most areas are cultivated, but some areas are wooded or are used for pasture and hay or for specialty crops, such as melons, pumpkins, and cantaloupes. This soil is unsuited to cultivated row crops because of the hazard of soil blowing and the low available water capacity (fig. 13). It is poorly suited to small grain, moderately suited to pasture and hay, and well suited to specialty crops. If irrigated, it is moderately suited to cultivated crops. It is moderately well suited to woodland. It is well suited to use as a site for dwellings. It is poorly suited to septic tank absorption fields.

Soil blowing, low fertility, and the low available water capacity are management concerns in irrigated areas used for corn, soybeans, or small grain and in nonirrigated areas used for small grain. Using a system of conservation tillage that leaves crop residue on the surface after planting and establishing field windbreaks help to control soil blowing and conserve soil moisture. An irrigation system can supply additional water. Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and improves fertility.

In areas used for pasture and hay, the low available water capacity, low fertility, and soil blowing are management concerns. Planting drought-tolerant grasses and legumes helps to maintain or improve forage stands. Frequent applications of small amounts of fertilizer help to prevent excessive loss of plant nutrients through leaching. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition and help to control soil blowing.

If this soil is used as woodland, seedling mortality caused by the low available water capacity is a management concern. Planting species that can tolerate droughty conditions, eliminating all vegetation within 2 feet of the existing or planted seedlings, or using large seedlings reduces the seedling mortality rate. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

In areas used for specialty crops, soil blowing is a hazard. Field windbreaks and border strips reduce this hazard.

If this soil is used as a site for septic tank absorption fields, a poor filtering capacity is a limitation. The soil readily absorbs but does not adequately filter the

effluent from septic tanks. The poor filtering capacity can result in the contamination of ground water. Filling or mounding with suitable material can increase the filtering capacity of the field.

The land capability classification is VIs.

54D—Plainfield sand, 7 to 15 percent slopes. This strongly sloping, excessively drained soil is on dunes, stream terraces, and uplands. Individual areas are irregular in shape or linear and range from 3 to 340 acres in size.

Typically, the surface layer is dark brown, very friable sand about 10 inches thick. The subsoil is dark yellowish brown, very friable and loose sand about 19 inches thick. The underlying material to a depth of 60 inches or more is loose sand. The upper part is yellowish brown, and the lower part is brownish yellow. In some areas the lower part of the profile contains more clay. In some places the upper part of the profile is fine sand. In other places the surface layer is darker and thicker.

Included with this soil in mapping are small areas of the well drained Alvin soils. These soils are in landscape positions similar to those of the Plainfield soil. They make up 1 to 5 percent of the unit.

Water and air move through the Plainfield soil at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is low. The content of organic matter also is low.

Most areas are cultivated or wooded, but some areas are used for pasture and hay. This soil is unsuited to cultivated row crops because of soil blowing and the low available water capacity. It is poorly suited to small grain and moderately suited to pasture and hay. If irrigated, it is moderately suited to cultivated crops. It is moderately well suited to woodland. It is moderately suited to use as a site for dwellings. It is poorly suited to septic tank absorption fields.

Soil blowing, water erosion, the low available water capacity, and low fertility are management concerns in areas used for corn, soybeans, or small grain. Leaving crop residue on the surface and establishing field windbreaks help to control soil blowing and water erosion and conserve soil moisture. An irrigation system can supply additional water. Leaving crop residue on the surface or regularly adding other organic material conserves soil moisture, helps to maintain tilth, and improves fertility.

In areas used for pasture and hay, the low available water capacity, low fertility, soil blowing, and water erosion are management concerns. Planting drought-tolerant grasses and legumes helps to maintain or improve forage stands. Frequent applications of small amounts of fertilizer help to prevent excessive loss of plant nutrients through leaching. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition and help to control water erosion and soil blowing.

If this soil is used as woodland, seedling mortality caused by the low available water capacity is a management concern. Planting species that can tolerate droughty conditions, eliminating all vegetation within 2 feet of the existing or planted seedlings, or using large seedlings can reduce the seedling mortality rate. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

If this soil is used as a site for dwellings, the slope is a limitation. Cutting, filling, and land shaping help to overcome this limitation.

If this soil is used as a site for septic tank absorption fields, the slope and a poor filtering capacity are limitations. The soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the contamination of ground water. Filling or mounding with suitable material can increase the filtering capacity of the field.

The land capability classification is VIs.

54E—Plainfield sand, 15 to 30 percent slopes. This steep, excessively drained soil is on dunes, stream terraces, and uplands. Individual areas are irregular in shape or linear and range from 3 to 40 acres in size.

Typically, the surface layer is black, loose sand about 2 inches thick. The subsoil is yellowish brown, loose sand about 29 inches thick. The underlying material to a depth of 60 inches or more is yellowish brown, loose sand. In some areas the lower part of the profile contains more clay. In other areas the surface layer is more than 10 inches thick. In places the upper part of the profile is fine sand.

Included with this soil in mapping are small areas of the well drained Alvin soils. These soils are in landscape positions similar to those of the Plainfield soil. They make up 1 to 5 percent of the unit.

Water and air move through the Plainfield soil at a rapid rate. Surface runoff is medium. Available water capacity is low. The content of organic matter also is low.

Most areas are used as woodland. This soil is moderately well suited to woodland. Because of the slope, the soil is unsuited to cultivated crops and to use as a site for dwellings or for septic tank absorption fields.

If this soil is used as woodland, the erosion hazard, the equipment limitation, seedling mortality, and plant

competition are management concerns. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes, the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Equipment should be used only during periods when the soil is firm enough to support a load. The seedling mortality rate can be reduced by planting species that can withstand droughty conditions, by eliminating all competing vegetation near the seedlings, and by selecting the larger seedlings for planting. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees and damage to tree roots.

The land capability classification is VIIs.

67—Harpster silty clay loam. This nearly level, poorly drained, calcareous soil is in broad, low areas on stream terraces. It is occasionally ponded for brief periods in winter and spring. Individual areas are irregular in shape and range from 3 to 4,300 acres in size.

Typically, the surface layer is black, friable silty clay loam about 8 inches thick. The subsurface layer is black, firm silty clay loam about 7 inches thick. The subsoil is about 31 inches thick. It is mottled. The upper part is dark gray, friable silty clay loam; the next part is light olive gray, friable silt loam; and the lower part is olive gray, friable silt loam. The underlying material to a depth of 60 inches or more is olive, mottled, friable, stratified loam and sandy loam. In some areas the soil contains more sand in the upper part.

Included with this soil in mapping are small areas of Drummer, Elburn, Pella, and Selma soils. These soils are not calcareous throughout. Drummer, Pella, and Selma soils are in landscape positions similar to those of the Harpster soil. The somewhat poorly drained Elburn soils are on slight rises above the Harpster soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Harpster soil at a moderate rate. Surface runoff is slow to ponded. The seasonal high water table ranges from 0.5 foot above to 2.0 feet below the surface during winter and spring. Available water capacity is high. The content of organic matter also is high. The surface layer may become compact and cloddy if it is tilled when too wet. The shrink-swell potential is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

Most areas of this soil are sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile generally function satisfactorily if suitable outlets are available. No applications of lime are needed. Keeping tillage at a minimum and returning crop residue to the soil can improve tilth, prevent surface compaction and crusting, increase the rate of water infiltration, and maintain productivity.

If this soil is used as a site for dwellings, the ponding and the shrink-swell potential are management concerns. Diverting surface water or constructing the building on raised fill material helps to overcome the ponding. Subsurface tile drains and surface inlet tile drains help to lower the water table. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table, the ponding, and the restricted permeability are management concerns. Surface and subsurface drains help to control the ponding and the seasonal high water table. Also, grading and land shaping help to remove excess surface water. Adding several feet of suitable fill material helps to overcome the ponding and the restricted permeability. Enlarging the absorption area also helps to overcome the restricted permeability.

The land capability classification is IIw.

68—Sable silty clay loam. This nearly level, poorly drained soil is in low areas and drainageways on uplands. It is occasionally ponded for brief periods in spring. Individual areas are irregular in shape and range from 3 to 140 acres in size.

Typically, the surface layer is black, firm silty clay loam about 9 inches thick. The subsurface layer is friable silty clay loam about 13 inches thick. The upper part is black, and the lower part is very dark gray and is mottled. The subsoil is mottled, friable silty clay loam about 24 inches thick. The upper part is dark gray, and the lower part is grayish brown. The underlying material to a depth of 60 inches or more is grayish brown, mottled, friable silt loam. In some areas the subsurface layer is thinner and lighter colored. In other areas the subsoil is calcareous at a depth of less than 35 inches. In a few places as much as 20 inches of light-colored silty material has recently been deposited.

Included with this soil in mapping are small areas of the somewhat poorly drained Ipava and well drained Tama soils. These soils are on slight rises above the Sable soil. They make up 1 to 5 percent of the unit.

Water and air move through the Sable soil at a moderate rate. Surface runoff is slow to ponded in cultivated areas. The seasonal high water table ranges from 0.5 foot above to 2.0 feet below the surface during spring. Available water capacity is high. The content of

organic matter also is high. The shrink-swell potential is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

Most areas of this soil are sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Using a system of conservation tillage that leaves crop residue on the surface after planting and returning crop residue to the soil can improve tilth, prevent surface compaction and crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings, the ponding and the shrink-swell potential are management concerns. Diverting surface water or constructing the building on raised fill material helps to overcome the ponding. Subsurface tile drains and surface inlet tile drains help to lower the water table. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the ponding and the restricted permeability are management concerns. Surface and subsurface drains help to control the ponding. Grading and land shaping can help to remove excess surface water. Adding several feet of suitable fill material helps to overcome the ponding and the restricted permeability. Enlarging the absorption area also helps to overcome the restricted permeability.

The land capability classification is IIw.

88B—Sparta loamy sand, 1 to 7 percent slopes. This gently sloping, excessively drained soil is on stream terraces, dunes, and uplands. Individual areas are irregular in shape and range from 3 to 800 acres in size.

Typically, the surface layer is very dark grayish brown, very friable loamy sand about 9 inches thick. The subsurface layer is dark brown, very friable loamy sand about 14 inches thick. The subsoil is about 15 inches thick. The upper part is brown, very friable loamy sand, and the lower part is dark yellowish brown, very friable sand. The underlying material to a depth of 60 inches or more is loose sand. The upper part is dark yellowish brown, and the lower part is strong brown. In some areas the soil does not have a subsurface layer. In other areas the lower part of the subsoil contains more clay. In some places the subsurface layer is thicker.

Included with this soil in mapping are small areas of the well drained Disco and Onarga soils, the poorly drained Udolpho soils, and the somewhat poorly drained Watseka soils. Disco, Onarga, and Watseka soils are in slightly lower positions on the landscape than those of the Sparta soil. Udolpho soils are in depressions below the Sparta soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Sparta soil at a rapid rate. Surface runoff is slow. Available water capacity is low. The content of organic matter also is low.

Most areas are cultivated. This soil is poorly suited to cultivated crops. If irrigated, however, it is moderately suited. It is well suited to specialty crops, such as melons, pumpkins, and cantaloupes. It is well suited to use as a site for dwellings. It is poorly suited to septic tank absorption fields.

Soil blowing, low fertility, and the low available water capacity are management concerns in areas used for corn, soybeans, or small grain. Using a system of conservation tillage that leaves crop residue on the surface after planting and establishing field windbreaks help to control soil blowing and conserve soil moisture. Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and improves fertility.

If this soil is used as a site for septic tank absorption fields, a poor filtering capacity is a limitation. The soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the contamination of ground water. Filling or mounding with suitable material can increase the filtering capacity of the field.

The land capability classification is IVs.

88D—Sparta loamy sand, 7 to 15 percent slopes. This strongly sloping, excessively drained soil is on stream terraces, dunes, and uplands. Individual areas are irregular in shape or linear and range from 3 to 30 acres in size.

Typically, the surface layer is very dark gray, very friable loamy sand about 7 inches thick. The subsurface layer is very friable loamy sand about 14 inches thick. The upper part is very dark grayish brown, and the lower part is dark brown. The subsoil is about 18 inches thick. The upper part is dark brown, very friable loamy sand, and the lower part is dark yellowish brown, loose, stratified sand and loamy sand. The underlying material to a depth of 60 inches or more is strong brown, loose sand. In some areas the lower part of the subsoil contains more clay. In other areas the soil does not have a subsurface layer.

Included with this soil in mapping are small areas of the well drained Onarga soils. These soils are in landscape positions similar to those of the Sparta soil. They make up 1 to 10 percent of the unit.

Water and air move through the Sparta soil at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is low. The content of organic matter also is low.

Most areas are cultivated or are used for pasture and hay. This soil is unsuited to cultivated row crops because of soil blowing and the low available water capacity. It is poorly suited to small grain and moderately suited to pasture and hay. If irrigated, however, it is moderately suited to cultivated crops. It is moderately suited to use as a site for dwellings. It is poorly suited to septic tank absorption fields.

Soil blowing, water erosion, the low available water capacity, and low fertility are management concerns in areas used for small grain, corn, or soybeans. Establishing field windbreaks and leaving crop residue on the surface help to control soil blowing. Leaving crop residue on the surface or regularly adding other organic material conserves soil moisture, maintains tilth, and improves fertility. An irrigation system can supply additional water.

In areas used for pasture and hay, the low available water capacity, low fertility, soil blowing, and water erosion are management concerns. Planting drought-tolerant grasses and legumes helps to maintain or improve forage stands. Frequent applications of small amounts of fertilizer help to prevent excessive loss of plant nutrients through leaching. Proper stocking rates, pasture rotation, and timely deferment of grazing help to keep the pasture in good condition and help to control erosion.

If this soil is used as a site for dwellings, the slope is a limitation. Cutting, filling, and land shaping help to overcome this limitation.

If this soil is used as a site for septic tank absorption fields, the slope and a poor filtering capacity are limitations. The soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the contamination of ground water. Filling or mounding with suitable material can increase the filtering capacity of the field.

The land capability classification is VIs.

89—Maumee loamy sand. This nearly level, poorly drained soil is in low areas on stream terraces. It is occasionally ponded for brief periods in winter and spring. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is very dark gray, mottled, very friable loamy sand about 7 inches thick. The subsurface layer is mottled, very friable loamy sand about 11 inches thick. The upper part is very dark gray, and the lower part is very dark grayish brown. The subsoil is about 19 inches thick. It is mottled. The upper part is dark gray, very friable loamy sand; the next part is dark grayish brown, very friable loamy sand; and the lower part is grayish brown, very friable sand. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, loose sand. In some places the subsurface layer is thicker. In other places the soil contains more clay throughout.

Water and air move through this soil at a rapid rate. Surface runoff is very slow or ponded in cultivated areas. The seasonal high water table ranges from 0.5 foot above to 1.0 foot below the surface during winter and spring. Available water capacity is low. The content of organic matter is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

If properly managed, this soil is suited to corn, soybeans, and small grain. Soil blowing and the low available water capacity are management concerns. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Using a system of conservation tillage that leaves crop residue on the surface after planting helps to control soil blowing and conserves soil moisture. Returning crop residue to the soil helps to maintain tilth and fertility.

Ponding is a management concern in areas used for dwellings. Diverting surface water or constructing the building on raised fill material can help to overcome the ponding. Subsurface tile drains help to lower the water table.

The ponding and a hazard of ground-water contamination are management concerns in areas used for septic tank absorption fields. Using surface and subsurface drains and grading and land shaping help to control the ponding. Adding several feet of suitable fill material increases the depth to the seasonal high water table, increases the filtering capacity of the soil, and helps to prevent ground-water contamination.

The land capability classification is IIIw.

98B—Ade loamy fine sand, 1 to 7 percent slopes. This gently sloping, somewhat excessively drained soil is on stream terraces, uplands, and dunes. Individual areas are irregular in shape and range from 3 to 300 acres in size.

Typically, the surface layer is very dark grayish brown, very friable loamy fine sand about 8 inches thick. The subsurface layer is very dark grayish brown and dark brown, very friable loamy fine sand about 14 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is brown, very friable

loamy fine sand, and the lower part is alternating bands of dark brown, very friable fine sandy loam and dark yellowish brown, loose fine sand. In some areas the lower part of the profile contains less clay. In other areas the soil does not have a subsurface layer.

Included with this soil in mapping are small areas of the poorly drained Gilford, well drained Onarga, excessively drained Plainfield, and somewhat poorly drained Watseka soils. Gilford, Onarga, and Watseka soils are in lower positions on the landscape than those of the Ade soil. Plainfield soils are in landscape positions similar to those of the Ade soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Ade soil at a rapid rate. Surface runoff is slow. Available water capacity is low. The content of organic matter is moderately low.

Most areas are cultivated. This soil is poorly suited to cultivated crops. It is well suited to specialty crops, such as melons, pumpkins, and cantaloupes. If irrigated, it is moderately suited to cultivated crops. It is well suited to use as a site for dwellings. It is poorly suited to septic tank absorption fields.

Soil blowing, the low available water capacity, and low fertility are management concerns in areas used for corn, soybeans, or small grain. Using a system of conservation tillage that leaves crop residue on the surface after planting and establishing field windbreaks help to control soil blowing and conserve soil moisture. Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and improves fertility.

A poor filtering capacity is a management concern in areas used for septic tank absorption fields. The soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the contamination of ground water. Filling or mounding with suitable material can increase the filtering capacity of the field.

The land capability classification is IIIs.

100—Palms muck. This nearly level, very poorly drained soil is in lake basins and on stream terraces. It is frequently ponded for brief periods in winter and spring. Individual areas are irregular in shape and range from 5 to 370 acres in size.

Typically, the surface soil is black, friable muck about 24 inches thick. The underlying material to a depth of 60 inches or more is mottled, friable silt loam. The upper part is grayish brown, the next part is light brownish gray, and the lower part is gray. In some areas the underlying material is sandy. In other areas the organic layer is thicker. In some places the soil contains free carbonates.

Included with this soil in mapping are small areas of the poorly drained Canisteo, Drummer, and Marshan soils. These soils do not have organic layers. They are in slightly higher positions on the landscape than those of the Palms soil. They make up 1 to 10 percent of the unit.

Water and air move through the Palms soil at a moderate rate. Surface runoff is very slow or ponded. The seasonal high water table ranges from 1 foot above to 1 foot below the surface during winter and spring. Available water capacity is very high. The content of organic matter also is very high. The soil is unstable. It is highly compressible if supporting a load and is subject to subsidence if it is drained.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to pasture and hay. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the ponding, low strength, and the hazard of subsidence.

In areas where a drainage system has been installed, this soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains function satisfactorily if suitable outlets are available. Using minimum tillage and returning crop residue to the soil help to maintain tilth and fertility.

Forage plants can be grown on this soil. Overgrazing or grazing when the soil is too wet, however, reduces forage production. Ponding of water in hoof prints and damage to the turf are management concerns. Proper stocking rates and timely deferment of grazing help to keep the pasture in good condition. Forage plants that can tolerate wet soil conditions should be selected.

The land capability classification is IIIw.

103—Houghton muck. This nearly level, very poorly drained soil is in lake basins and on stream terraces. It is frequently ponded for brief periods in winter and spring. Individual areas are irregular in shape or linear and range from 30 to 100 acres in size.

Typically, the soil is black, friable muck to a depth of 60 inches or more. In some areas the organic material is thinner. In other areas the soil is calcareous throughout.

Included with this soil in mapping are small areas of the poorly drained Drummer and Marshan soils. These soils do not have organic layers. They are slightly higher on the landscape than the Houghton soil. They make up 1 to 10 percent of the unit.

Water and air move through the Houghton soil at a moderate rate. Surface runoff is very slow or ponded in cultivated areas. The seasonal high water table ranges from 1 foot above to 1 foot below the surface during winter and spring. Available water capacity is very high. The content of organic matter also is very high. The soil

is very unstable. It is highly compressible if supporting a heavy load and is subject to subsidence if drained.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops and to pasture and hay. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the ponding, low strength, and the hazard of subsidence.

In areas where a drainage system has been installed, this soil commonly is sufficiently drained for corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains function satisfactorily if suitable outlets are available. Tile drains do not function well, however, because the soil is subject to subsidence. Minimizing tillage and returning crop residue to the soil help to maintain tilth and fertility.

Forage plants can be grown on this soil. Overgrazing or grazing when the soil is too wet, however, reduces forage production and causes surface compaction and poor tilth. Proper stocking rates and timely deferment of grazing help to keep the pasture in good condition. Forage plants that can tolerate wet soil conditions should be selected.

The land capability classification is IIIw.

125—Selma clay loam. This nearly level, poorly drained soil is in broad, low areas on stream terraces. It is occasionally ponded for brief periods in spring. Individual areas are irregular in shape and range from 3 to 3,400 acres in size.

Typically, the surface layer is black, friable clay loam about 11 inches thick. The subsurface layer is very dark gray, mottled, friable clay loam about 9 inches thick. The subsoil is mottled, friable clay loam about 28 inches thick. The upper part is dark grayish brown, and the lower part is gray. The underlying material to a depth of 60 inches or more is stratified light brownish gray sand and grayish brown, very friable sandy loam. In some areas the upper part of the soil contains less sand or less clay. In other areas, the subsoil is thinner and the underlying material is loose sand.

Included with this soil in mapping are small areas of the calcareous Canisteo, well drained Onarga, and somewhat poorly drained Ridgeville and Watseka soils. Canisteo soils are in landscape positions similar to those of the Selma soil. Onarga, Ridgeville, and Watseka soils are on slight rises above the Selma soil. Included soils make up 1 to 5 percent of the unit.

Water and air move through the Selma soil at a moderately rapid rate. Surface runoff is very slow or ponded in cultivated areas. The seasonal high water table ranges from 0.5 foot above to 2.0 feet below the surface during spring. Available water capacity is high. The content of organic matter also is high. The surface layer may become compact and cloddy if it is tilled when too wet.

Most areas are cultivated. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

If properly managed, this soil is suited to corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Using a system of conservation tillage that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, prevent surface compaction and crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings, the ponding and the shrink-swell potential are management concerns. Diverting surface water or constructing the building on raised fill material can help to overcome the ponding. Subsurface tile drains and surface inlet tile drains can help to lower the water table. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the ponding is a management concern. Installing surface and subsurface drains, grading, and land shaping help to control the ponding. Adding several feet of suitable fill also can help to overcome the ponding.

The land capability classification is IIw.

131A—Alvin fine sandy loam, 0 to 2 percent slopes. This nearly level, well drained soil is on stream terraces and uplands. Individual areas are irregular in shape and range from 3 to 120 acres in size.

Typically, the surface layer is dark brown, friable fine sandy loam about 5 inches thick. The subsurface layer is yellowish brown, friable fine sandy loam about 13 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is yellowish brown, friable fine sandy loam; the next part is yellowish brown, friable loam; and the lower part is alternating bands of strong brown, very friable loamy fine sand and dark brown, friable fine sandy loam. In some areas the surface layer is darker and thicker. In other areas the subsoil contains less clay and more sand.

Included with this soil in mapping are small areas of the somewhat excessively drained Bloomfield, excessively drained Plainfield, and somewhat poorly drained Ridgeville soils. Bloomfield and Plainfield soils are on slight rises above the Alvin soil. Ridgeville soils are in slightly lower positions on the landscape than those of the Alvin soil. Included soils make up 1 to 15 percent of the unit.

Water and air move through the Alvin soil at a

moderately rapid rate. Surface runoff is slow. Available water capacity is moderate. The content of organic matter is low.

Most areas are cultivated, but some areas are wooded or are used for pasture and hay. This soil is moderately suited to cultivated crops and to pasture and hay. If irrigated, it is well suited to cultivated crops. It is moderately well suited to woodland. It is well suited to use as a site for dwellings or for septic tank absorption fields.

Soil blowing, low fertility, and the moderate available water capacity are management concerns in areas used for corn, soybeans, or small grain. Using a system of conservation tillage that leaves crop residue on the surface after planting and establishing field windbreaks help to control soil blowing and conserve soil moisture. Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and improves fertility.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent damage caused by soil blowing. The plants should not be grazed until they are sufficiently established. Applications of fertilizer and lime are needed.

If this soil is used as woodland, plant competition is a management concern. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The land capability classification is IIs.

131B—Alvin fine sandy loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on ridges and side slopes on stream terraces and uplands. Individual areas are irregular in shape and range from 3 to 130 acres in size.

Typically, the surface layer is dark brown, very friable fine sandy loam about 5 inches thick. The subsurface layer is brown, very friable loamy fine sand about 6 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is dark yellowish brown, friable fine sandy loam; the next part is brown, friable fine sandy loam and loam; and the lower part is strong brown, friable fine sandy loam and loamy fine sand. In some areas the subsurface layer is darker. In other areas the subsoil contains less clay and more sand.

Included with this soil in mapping are small areas of the somewhat excessively drained Bloomfield, excessively drained Plainfield, and somewhat poorly drained Ridgeville soils. Bloomfield and Plainfield soils are in landscape positions similar to those of the Alvin soil. Ridgeville soils are in lower positions on the landscape than those of the Alvin soil. Included soils make up 1 to 15 percent of the unit.

Water and air move through the Alvin soil at a moderately rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. The content of organic matter is low.

Most areas are cultivated, but some areas are wooded or are used for pasture and hay. This soil is moderately suited to cultivated crops and to pasture and hay. It is moderately well suited to woodland. It is well suited to use as a site for dwellings or for septic tank absorption fields.

Soil blowing, water erosion, low fertility, and the moderate available water capacity are management concerns in areas used for corn, soybeans, or small grain. Using a system of conservation tillage that leaves crop residue on the surface after planting and establishing field windbreaks help to control water erosion and soil blowing and conserve soil moisture. Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and improves fertility.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent damage caused by water erosion and soil blowing. The plants should not be grazed until they are sufficiently established. Applications of fertilizer and lime are needed.

If this soil is used as woodland, plant competition is a management concern. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The land capability classification is IIe.

131C2—Alvin fine sandy loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on ridges and side slopes in the uplands and on stream terraces. Individual areas are irregular in shape or linear and range from 3 to 90 acres in size.

Typically, the surface layer is dark brown, friable fine sandy loam about 9 inches thick. It contains some dark yellowish brown subsoil material. The subsoil extends to a depth of more than 60 inches. The upper part is dark yellowish brown, friable loam; the next part is dark yellowish brown, friable fine sandy loam; and the lower part is alternating bands of dark yellowish brown, very friable fine sandy loam and yellowish brown, loose

loamy fine sand. In some places the soil contains less clay throughout.

Included with this soil in mapping are small areas of the sandy Bloomfield and Plainfield soils and the silty Fayette and Middletown soils. These soils are in landscape positions similar to those of the Alvin soil. They make up 1 to 15 percent of the unit.

Water and air move through the upper part of the Alvin soil at a moderate rate and through the lower part at a moderately rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. The content of organic matter is low.

Most areas are cultivated, but some areas are used for pasture or are wooded. This soil is moderately suited to cultivated crops and to pasture and hay. It is moderately well suited to woodland. It is well suited to use as a site for dwellings or for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these helps to control erosion and maintain the productivity of the soil. Minimizing tillage and returning crop residue to the soil or regularly adding other organic material help to maintain tilth and improve fertility.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer and lime are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as woodland, plant competition is a management concern. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The land capability classification is IIIe.

131D2—Alvin fine sandy loam, 10 to 18 percent slopes, eroded. This strongly sloping, well drained soil is on upland side slopes. Individual areas are linear or irregular in shape and range from 3 to 55 acres in size.

Typically, the surface layer is dark brown, friable fine sandy loam about 7 inches thick. It contains some dark yellowish brown subsoil material. The subsoil extends to a depth of more than 60 inches. The upper part is brown, friable fine sandy loam, and the lower part is alternating bands of brown, loose fine sand and dark brown, friable fine sandy loam and loamy fine sand. In some areas the soil contains less clay. In other areas the surface layer is lighter colored because of severe erosion.

Included with this soil in mapping are small areas of the sandy Bloomfield and Plainfield soils and the silty Fayette soils. These soils are in landscape positions similar to those of the Alvin soil. They make up 1 to 15 percent of the unit.

Water and air move through the upper part of the Alvin soil at a moderate rate and through the lower part at a moderately rapid rate. Surface runoff is rapid in cultivated areas. Available water capacity is moderate. The content of organic matter is low.

Most areas are used for pasture or are wooded, but some areas are cultivated. This soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay. It is moderately well suited to woodland. It is moderately suited to use as a site for dwellings or for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these helps to control erosion and maintain the productivity of the soil. Minimizing tillage and returning crop residue to the soil or regularly adding other organic material help to maintain tilth and improve fertility.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer and lime are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as woodland, plant competition is a management concern. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

If this soil is used as a site for dwellings or septic tank absorption fields, the slope is a limitation. Cutting,

filling, and land shaping help to overcome this limitation on sites for dwellings. Installing the filter lines on the contour helps to overcome the slope on sites for septic tank absorption fields.

The land capability classification is IIIe.

131F—Alvin fine sandy loam, 18 to 30 percent slopes. This steep, well drained soil is on upland side slopes. Individual areas are linear and range from 2 to 145 acres in size.

Typically, the surface layer is very dark grayish brown, friable fine sandy loam about 3 inches thick. The subsurface layer is brown, friable loamy fine sand about 8 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is dark yellowish brown, friable fine sandy loam; the next part is strong brown, friable fine sandy loam; and the lower part is alternating bands of yellowish brown, very friable loamy fine sand and strong brown, friable fine sandy loam. In some areas the soil contains less clay throughout.

Included with this soil in mapping are small areas of the silty Fayette and sandy Plainfield soils. These soils are in landscape positions similar to those of the Alvin soil. They make up 1 to 15 percent of the unit.

Water and air move through the upper part of the Alvin soil at a moderate rate and through the lower part at a moderately rapid rate. Surface runoff is rapid. Available water capacity is moderate. The content of organic matter is low.

Most areas are wooded or are used for pasture. This soil is moderately suited to pasture. It is moderately well suited to woodland. Because of the slope, it is unsuited to cultivated crops and to use as a site for dwellings or for septic tank absorption fields.

Erosion control is needed when grasses and legumes are established in the pastured areas. In areas where the pasture is established, no-till interseeding of legumes and seeding on the contour improve forage quality and help to control erosion. A permanent cover of pasture plants helps to control erosion and maintains tilth. Operating machinery is difficult on the steeper slopes. Selection of suitable species for planting, proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer and lime help to keep the pasture in good condition.

If this soil is used as woodland, the erosion hazard and the equipment limitation are management concerns because of the slope. Plant competition also is a management concern. Logging roads and skid trails should be on or near the contour. On the steeper slopes, logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Equipment should be used only during periods when the soil is firm. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The land capability classification is VIe.

150A—Onarga sandy loam, 0 to 2 percent slopes. This nearly level, well drained soil is on rises on stream terraces and uplands. Individual areas are irregular in shape and range from 3 to 640 acres in size.

Typically, the surface soil is very dark grayish brown, friable sandy loam about 18 inches thick. The subsoil is about 18 inches thick. The upper part is dark brown, friable sandy loam; the next part is dark yellowish brown, friable sandy loam; and the lower part is dark yellowish brown, very friable loamy sand. The underlying material to a depth of 60 inches or more is dark yellowish brown, loose sand. In some areas the upper part of the subsoil is darker. In other areas the subsoil contains more clay. Some places have deposits of sandy eolian material as much as 10 inches thick.

Included with this soil in mapping are small areas of the somewhat excessively drained Ade, somewhat poorly drained Ridgeville, and excessively drained Sparta soils. Ade and Sparta soils are in slightly higher positions on the landscape than those of the Onarga soil. Ridgeville soils are in the lower positions on the landscape. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Onarga soil at a rapid rate. Surface runoff is slow. Available water capacity is moderate. The content of organic matter also is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to pasture and hay. If irrigated, it is well suited to cultivated crops. It is well suited to use as a site for dwellings. It is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, soil blowing and the moderate available water capacity are management concerns. Using a system of conservation tillage that leaves crop residue on the surface after planting and establishing field windbreaks conserve soil moisture and help to prevent excessive soil loss and the damage caused by windblown soil particles. Returning crop residue to the soil helps to maintain tilth and fertility.

If this soil is used as a site for septic tank absorption fields, a poor filtering capacity is a limitation. The soil readily absorbs but does not adequately filter the

effluent from septic tanks. The poor filtering capacity can result in the contamination of ground water. Filling or mounding with suitable material can increase the filtering capacity of the field.

The land capability classification is IIs.

150B—Onarga sandy loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on ridges and side slopes on stream terraces and uplands. Individual areas are irregular in shape or linear and range from 3 to 80 acres in size.

Typically, the surface layer is very dark grayish brown, friable sandy loam about 9 inches thick. The subsurface layer is friable sandy loam about 10 inches thick. The upper part is very dark grayish brown, and the lower part is dark brown. The subsoil is about 17 inches thick. The upper part is dark brown, friable sandy loam, and the lower part is dark yellowish brown, friable, stratified loamy sand and sandy loam. The underlying material to a depth of 60 inches or more is brown, loose, stratified loamy sand and sand. In some areas the subsoil contains more clay. In other areas the soil does not have a subsurface layer. In some places the surface layer is loamy sand.

Included with this soil in mapping are small areas of the somewhat excessively drained Ade, silty Pillot, and excessively drained Sparta soils. These soils are in landscape positions similar to those of the Onarga soil. They make up 1 to 15 percent of the unit.

Water and air move through the Onarga soil at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. The content of organic matter also is moderate.

Most areas are cultivated, but some areas are used for pasture and hay. This soil is moderately suited to cultivated crops and to pasture and hay. If irrigated, it is well suited to cultivated crops. It is well suited to use as a site for dwellings. It is poorly suited to septic tank absorption fields.

Soil blowing, water erosion, and the moderate available water capacity are management concerns in areas used for corn, soybeans, or small grain. Using a system of conservation tillage that leaves crop residue on the surface after planting and establishing field windbreaks help to control soil blowing and water erosion and conserve soil moisture. Returning crop residue to the soil helps to maintain tilth and fertility.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent damage caused by water erosion and soil blowing. The plants should not be grazed until they are sufficiently established. Applications of fertilizer and lime are needed.

If this soil is used as a site for septic tank absorption fields, a poor filtering capacity is a limitation. The soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the contamination of ground water. Filling or mounding with suitable material can increase the filtering capacity of the field.

The land capability classification is IIe.

150C2—Onarga fine sandy loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on ridges and side slopes in the uplands and on stream terraces. Individual areas are irregular in shape or linear and range from 3 to 70 acres in size.

Typically, the surface layer is dark brown, very friable fine sandy loam about 9 inches thick. It contains some brown subsoil material in the lower part. The subsoil is about 29 inches thick. The upper part is brown, very friable fine sandy loam that is mixed with some dark brown material from the surface layer. The next part is brown, friable fine sandy loam. The lower part is strong brown, friable and very friable fine sandy loam. The underlying material to a depth of 60 inches or more is stratified yellowish brown and brown, very friable loamy fine sand and fine sandy loam. In places the soil contains more clay throughout. In a few areas the surface layer is thicker. In other areas the surface layer is sandy.

Included with this soil in mapping are small areas of the somewhat excessively drained Ade, silty Pillot, and excessively drained Sparta soils. These soils are in landscape positions similar to those of the Onarga soil. They make up 1 to 15 percent of the unit.

Water and air move through the Onarga soil at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. The content of organic matter also is moderate.

Most areas are cultivated, but some areas are used for pasture and hay. This soil is moderately suited to cultivated crops and to pasture and hay. It is well suited to use as a site for dwellings. It is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface, a crop rotation in which close-growing grasses and legumes are grown for 1 year or more, contour farming, terraces, or a combination of these helps to control erosion and thus maintain the productivity of the soil. Minimizing tillage and returning crop residue to the soil help to maintain tilth and fertility.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion. Tilling on the contour when a

seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer and lime are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as a site for septic tank absorption fields, a poor filtering capacity is a limitation. The soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the contamination of ground water. Filling or mounding with suitable material can increase the filtering capacity of the field.

The land capability classification is IIIe.

151—Ridgeville sandy loam. This nearly level, somewhat poorly drained soil is on stream terraces and uplands. Individual areas are irregular in shape and range from 3 to 180 acres in size.

Typically, the surface soil is very dark grayish brown, friable sandy loam about 18 inches thick. The subsoil is dark grayish brown, mottled, friable sandy loam about 18 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, loose sand. In some areas the soil contains more or less clay. In other areas the upper part of the subsoil is darker.

Included with this soil in mapping are small areas of the poorly drained Gilford, Marshan, and Udolpho soils and the well drained Onarga soils. Gilford, Marshan, and Udolpho soils are in drainageways. Onarga soils are in slightly higher positions on the landscape than those of the Ridgeville soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Ridgeville soil at a moderately rapid rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet during spring. Available water capacity is moderate. The content of organic matter also is moderate.

Most areas are used for cultivated crops. This soil is moderately suited to cultivated crops. It is well suited to pasture and hay. If irrigated, it is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, soil blowing and the moderate available water capacity are management concerns. Using a system of conservation tillage that leaves crop residue on the surface and establishing field windbreaks conserve soil moisture and help to prevent excessive soil loss and the damage caused by windblown soil particles. Returning crop residue to the soil helps to maintain tilth and fertility.

If this soil is used as a site for dwellings or for septic tank absorption fields, the seasonal high water table is a limitation. Installing subsurface tile drains helps to overcome this limitation.

The land capability classification is IIs.

152—Drummer silty clay loam. This nearly level, poorly drained soil is in broad, low areas and drainageways on stream terraces. It is occasionally ponded for brief periods in spring. Individual areas are irregular in shape and range from 3 to more than 800 acres in size.

Typically, the surface layer is black, friable silty clay loam about 9 inches thick. The subsurface layer is black, mottled, friable silty clay loam about 10 inches thick. The subsoil is about 34 inches thick. It is mottled. The upper part is dark grayish brown, friable silty clay loam; the next part is light olive gray, friable silty clay loam; and the lower part is light olive gray, friable silt loam. The underlying material to a depth of 60 inches or more is mottled light olive gray, olive, and yellowish brown, friable, stratified sandy loam, loamy sand, and silt loam. In a few places the upper part of the profile contains more clay. In some areas the underlying material is sand. In a few areas free carbonates are within a depth of 35 inches. In other areas the upper part of the soil contains more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained, calcareous Harpster soils. These soils are in landscape positions similar to those of the Drummer soil. They make up 1 to 10 percent of the unit.

Water and air move through the Drummer soil at a moderate rate. Surface runoff is slow to ponded in cultivated areas. The seasonal high water table ranges from 0.5 foot above to 2.0 feet below the surface during spring. Available water capacity is high. The content of organic matter also is high. The surface layer may become compact and cloddy if it is tilled when too wet. The shrink-swell potential is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

If properly managed, this soil is suited to corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available (fig. 14). Land grading helps to control the ponding. Applying a system of conservation tillage that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings, the

Figure 14.—A surface drain in an area of Drummer silty clay loam. Surface drains help to lower the water table and remove surface water.

ponding, the seasonal high water table, and the shrink-swell potential are management concerns. Diverting surface water or constructing the building on raised fill material helps to overcome the ponding. Subsurface tile drains and surface inlet tile drains help to lower the water table. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the ponding, the restricted permeability, and the seasonal high water table are management concerns. Surface and subsurface drains help to control the ponding. Also, grading and land shaping help to remove excess surface water. Adding several feet of suitable fill material helps to overcome the ponding and the restricted permeability and increases the depth to the seasonal high water table. Enlarging the absorption area also helps to overcome the restricted permeability.

The land capability classification is IIw.

153—Pella silty clay loam. This nearly level, poorly drained soil is in broad, low areas on stream terraces. It is occasionally ponded for brief periods in spring. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is black, friable silty clay loam about 9 inches thick. The subsurface layer is very dark gray, mottled, friable silty clay loam about 4 inches thick. The subsoil is about 28 inches thick. It is mottled. In sequence downward, it is dark grayish brown, friable silty clay loam; grayish brown, friable silty clay loam; light brownish gray, friable silty clay loam; and light brownish gray, friable, calcareous silt loam. The underlying material extends to a depth of 60 inches or more. It is mottled, calcareous, and stratified. The upper part is light brownish gray, friable silt loam and loam, and the lower part is yellowish brown, very friable sandy loam and loamy sand. In some places free carbonates are at a lower depth. In other places the upper part of the soil contains more clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Elburn and calcareous Harpster soils. Elburn soils are on slight rises above the Pella soil. Harpster soils are in landscape positions similar to those of the Pella soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Pella soil at a moderate rate. Surface runoff is slow to ponded in cultivated areas. The seasonal high water table ranges from 0.5 foot above to 2.0 feet below the surface during spring. Available water capacity is high. The content of organic matter also is high. The surface layer may become compact and cloddy if it is tilled when too wet. The shrink-swell potential is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

If properly managed, this soil is suited to corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Using a system of conservation tillage that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, prevent surface compaction and crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings, the ponding, the seasonal high water table, and the shrink-swell potential are management concerns. Diverting surface water or constructing the building on raised fill material helps to overcome the ponding. Subsurface tile drains and surface inlet tile drains help to lower the water table. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the ponding, the restricted permeability, and the seasonal high water table are management concerns. Surface and subsurface drains help to control the ponding. Also, grading and land shaping help to remove excess surface water. Adding several feet of suitable fill material helps to overcome the ponding and the restricted permeability and increases the depth to the seasonal high water table. Enlarging the absorption area also helps to overcome the restricted permeability.

The land capability classification is IIw.

159A—Pillot silt loam, 0 to 2 percent slopes. This nearly level, well drained soil is on rises on uplands and stream terraces. Individual areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface soil is very dark grayish brown, friable silt loam about 20 inches thick. The subsoil is about 15 inches thick. The upper part is dark brown, friable silty clay loam, and the lower part is dark brown, friable loam. The underlying material to a depth of 60 inches or more is dark yellowish brown, loose loamy fine sand that has a few bands of fine sandy loam. In some areas the sandy underlying material is at a lower depth. In other areas the upper part of the soil contains more sand.

Included with this soil in mapping are small areas of the poorly drained Edgington, somewhat poorly drained Lawndale, and loamy Onarga soils. Edgington soils are in depressions and drainageways below the Pillot soil. Lawndale soils are in slightly lower positions on the landscape than those of the Pillot soil. Onarga soils are in landscape positions similar to those of the Pillot soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the upper part of the Pillot soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is slow. Available water capacity, the content of organic matter, and the shrink-swell potential are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to use as a site for dwellings with basements and moderately suited to use as a site for dwellings without basements. It is poorly suited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, the moderate available water capacity is a limitation. Using a system of conservation tillage that leaves crop residue on the surface conserves soil moisture. Returning crop residue to the soil helps to maintain tilth and fertility.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings without basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, a poor filtering capacity is a limitation. The soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the contamination of ground water. Filling or mounding with suitable material can increase the filtering capacity of the field.

The land capability classification is IIs.

159B—Pillot silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on upland ridges and side slopes. Individual areas are irregular in shape and range from 3 to 50 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is very dark grayish brown and dark brown, friable silt loam about 5 inches thick. The subsoil is about 24 inches thick. The upper part is dark brown

and dark yellowish brown, friable silty clay loam, and the lower part is dark yellowish brown, friable loam. The underlying material to a depth of 60 inches or more is yellowish brown, loose loamy fine sand and fine sand. In places the soil does not have a subsurface layer. In some areas the sandy underlying material is at a lower depth. In other areas the upper part of the soil contains more sand.

Included with this soil in mapping are small areas of the somewhat excessively drained Ade, poorly drained Edgington, somewhat poorly drained Lawndale, and loamy Onarga soils. Ade and Onarga soils are in landscape positions similar to those of the Pillot soil. Edgington soils are in drainageways and depressions below the Pillot soil. Lawndale soils are in lower positions on the landscape than those of the Pillot soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the upper part of the Pillot soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity, the content of organic matter, and the shrink-swell potential are moderate.

Most areas are cultivated, but some areas are used for pasture and hay. This soil is moderately suited to cultivated crops and to pasture and hay. It is well suited to use as a site for dwellings with basements and moderately suited to use as a site for dwellings without basements. It is poorly suited to septic tank absorption fields.

In areas used for corn, soybeans, or small grain, erosion and the moderate available water capacity are management concerns. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these helps to control erosion. Returning crop residue to the soil conserves soil moisture and helps to maintain tilth and fertility.

In areas used for pasture or hay, overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Proper stocking rates, pasture rotation, and timely deferment of grazing help to control erosion. Applications of fertilizer and lime help to keep the pasture in good condition.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings without basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, a poor filtering capacity is a limitation. The soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the contamination of ground water. Filling or mounding with suitable material can increase the filtering capacity of the field.

The land capability classification is IIe.

159C2—Pillot silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on upland ridges and side slopes. Individual areas are linear or irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. It contains some dark brown subsoil material. The subsoil is about 32 inches thick. In sequence downward, it is dark brown, friable silty clay loam; dark yellowish brown, friable silty clay loam and silt loam; dark yellowish brown, friable fine sandy loam; and yellowish brown, very friable loamy fine sand. The underlying material to a depth of 60 inches or more is yellowish brown, loose fine sand that has a few bands of loamy fine sand. Some areas are less sloping. In some places the sandy underlying material is at a lower depth. In other places the upper part of the soil contains more sand.

Included with this soil in mapping are small areas of the somewhat excessively drained Ade, poorly drained Edgington, and loamy Onarga soils. Ade and Onarga soils are in landscape positions similar to those of the Pillot soil. Edgington soils are in drainageways below the Pillot soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the upper part of the Pillot soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity, the content of organic matter, and the shrink-swell potential are moderate.

Most areas are cultivated, but some areas are used for pasture and hay. This soil is moderately suited to cultivated crops and to pasture and hay. It is well suited to use as a site for dwellings with basements and moderately suited to use as a site for dwellings without basements. It is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, a crop rotation in which close-growing grasses and legumes are grown for 1 year or more, contour farming, terraces, or a combination of these helps to control erosion and thus maintain the productivity of the soil. Minimizing tillage and returning crop residue to the soil help to maintain tilth and fertility.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion. Tilling on the contour when a

seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer and lime are needed. The plants should not be grazed or clipped until they are sufficiently established.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings without basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, a poor filtering capacity is a limitation. The soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the contamination of ground water. Filling or mounding with suitable material can increase the filtering capacity of the field.

The land capability classification is IIIe.

198—Elburn silt loam. This nearly level, somewhat poorly drained soil is on stream terraces. Individual areas are irregular in shape and range from 3 to 640 acres in size.

Typically, the surface soil is very dark gray, friable silt loam about 19 inches thick. The subsoil is about 36 inches thick. In sequence downward, it is dark grayish brown, friable silty clay loam; brown, mottled, friable silty clay loam; light brownish gray, mottled, friable silty clay loam; and mottled light brownish gray and yellowish brown, friable, stratified silt loam, fine sandy loam, and loamy fine sand. The underlying material to a depth of 60 inches or more is mottled light brownish gray and yellowish brown, friable, stratified silt loam, loamy fine sand, and fine sandy loam. In some areas the underlying material is sandy. In other areas the middle part of the subsoil contains more sand. In a few places the seasonal high water table is at a depth of 3 to 6 feet.

Included with this soil in mapping are small areas of the poorly drained Drummer and Thorp soils and the well drained Plano soils. Drummer and Thorp soils are in drainageways. Plano soils are on convex rises above the Elburn soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Elburn soil at a moderate rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet during spring. Available water capacity is high. The content of organic matter also is high. The shrink-swell potential is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. The seasonal high water table can delay planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. A system of conservation tillage that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations of buildings helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Subsurface tile drains can lower the water table.

The land capability classification is I.

199A—Plano silt loam, 0 to 2 percent slopes. This nearly level, well drained soil is on rises on stream terraces. Individual areas are irregular in shape and range from 3 to 130 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is very dark gray, friable silt loam about 6 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is dark brown, friable silt loam and silty clay loam; the next part is dark yellowish brown, friable silty clay loam; and the lower part is dark yellowish brown, friable loam. In some places the middle part of the subsoil contains more sand. In a few areas the seasonal high water table is at a depth of 4 to 6 feet. In other areas the lower part of the subsoil is sandy.

Included with this soil in mapping are small areas of the poorly drained Drummer and Thorp soils and the somewhat poorly drained Elburn soils. Drummer and Thorp soils are in drainageways and depressions below the Plano soil. Elburn soils are in slightly lower positions on the landscape than those of the Plano soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Plano soil at a moderate rate. Surface runoff is slow. Available water capacity is high. The content of organic matter is moderate. The shrink-swell potential also is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops. It is moderately suited to use as a site for dwellings. It is well suited to septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. Returning crop residue to the soil helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to

prevent the structural damage caused by shrinking and swelling.

The land capability classification is I.

199B—Plano silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on ridges and side slopes on stream terraces. Individual areas are irregular in shape or linear and range from 3 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is dark brown, friable silt loam about 6 inches thick. The subsoil extends to a depth of 60 inches or more. In sequence downward, it is dark brown, friable silty clay loam; dark yellowish brown, friable silty clay loam; dark yellowish brown, mottled, friable silty clay loam; and dark yellowish brown, mottled, friable, stratified silt loam, loam, and sandy loam. In some places the middle part of the subsoil contains more sand. In a few areas the seasonal high water table is at a depth of 4 to 6 feet. In some areas the lower part of the subsoil is sandy. In other areas the soil does not have a subsurface layer.

Included with this soil in mapping are small areas of the poorly drained Drummer and Thorp soils and the somewhat poorly drained Elburn soils. Drummer and Thorp soils are in drainageways and depressions below the Plano soil. Elburn soils are slightly lower on the landscape than the Plano soil. Included soils make up 1 to 5 percent of the unit.

Water and air move through the Plano soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. The content of organic matter is moderate. The shrink-swell potential also is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops. It is moderately suited to use as a site for dwellings. It is well suited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these helps to control erosion. Returning crop residue to the soil helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

200—Orio loam. This nearly level, poorly drained soil is in depressions and low areas on stream terraces. It is occasionally ponded for brief periods in spring. Individual areas are irregular in shape and range from 3 to 240 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 9 inches thick. The subsurface layer is grayish brown and light brownish gray, mottled, friable fine sandy loam about 16 inches thick. The subsoil is gray and light gray, mottled, firm clay loam and silty clay loam. The underlying material to a depth of 60 inches or more is grayish brown, very friable loamy sand that has a few bands of sandy loam. In some places the depth to the sandy underlying material is less than 40 inches. In a few areas the surface layer is thicker.

Included with this soil in mapping are small areas of the well drained Dakota and Onarga soils and the somewhat poorly drained Ridgeville soils. These soils are on slight rises above the Orio soil. They make up 1 to 5 percent of the unit.

Water and air move through the upper part of the Orio soil at a moderately slow rate and through the lower part at a rapid rate. Surface runoff is very slow or ponded in cultivated areas. The seasonal high water table ranges from 0.5 foot above to 1.0 foot below the surface during spring. Available water capacity is high. The content of organic matter is moderately low. The shrink-swell potential is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

If properly managed, this soil is suited to corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Using a system of conservation tillage that leaves crop residue on the surface after planting and returning crop residue to the soil help to prevent surface compaction and crusting, increase the rate of water infiltration, and improve fertility.

If this soil is used as a site for dwellings, the ponding and the shrink-swell potential are management concerns. Diverting surface water or constructing the building on raised fill material helps to overcome the ponding. Subsurface tile drains and surface inlet tile drains help to lower the water table. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for a septic tank absorption fields, the ponding and the restricted permeability are management concerns. Surface and subsurface drains help to remove excess surface water. Also, grading and land shaping help to remove excess surface water. Adding several feet of suitable fill

material helps to overcome the ponding and the restricted permeability. Enlarging the absorption area also helps to overcome the restricted permeability.

The land capability classification is IIw.

201—Gilford sandy loam. This nearly level, poorly drained soil is in low areas on stream terraces. It is occasionally ponded for brief periods in spring. Individual areas are irregular in shape and range from 3 to 220 acres in size.

Typically, the surface layer is black, friable sandy loam about 9 inches thick. The subsurface layer is very dark gray, friable sandy loam about 6 inches thick. The subsoil is about 21 inches thick. It is mottled. The upper part is dark grayish brown, friable sandy loam, and the lower part is dark grayish brown, very friable loamy sand. The underlying material to a depth of 60 inches or more is light brownish gray and yellowish brown, mottled, loose sand. In some places the subsurface layer is thicker. In other places the subsoil contains more or less clay.

Included with this soil in mapping are small areas of the well drained Onarga and somewhat poorly drained Watseka soils. These soils are in higher positions on the landscape than those of the Gilford soil. They make up 1 to 10 percent of the unit.

Water and air move through the Gilford soil at a rapid rate. Surface runoff is very slow or ponded in cultivated areas. The seasonal high water table ranges from 0.5 foot above to 1.0 foot below the surface during spring. Available water capacity is moderate. The content of organic matter also is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

If properly managed, this soil is suited to corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control ponding. Returning crop residue to the soil helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the ponding is a management concern. Diverting surface water or constructing the building on raised fill material helps to overcome the ponding. Subsurface tile drains and surface inlet tile drains help to lower the water table.

If this soil is used as a site for septic tank absorption fields, the ponding, the seasonal high water table, and a hazard of ground-water contamination are management concerns. Surface and subsurface drains and grading and land shaping help to control the ponding and the seasonal high water table. Adding several feet of suitable fill material increases the depth to the seasonal high water table, increases the filtering capacity of the soil, and helps to prevent ground-water contamination.

The land capability classification is IIw.

206—Thorp silt loam. This nearly level, poorly drained soil is in depressions and drainageways on stream terraces. It is occasionally ponded for brief periods in spring (fig. 15). Individual areas are linear or irregular in shape and range from 3 to 500 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 6 inches thick. The subsurface layer is friable silt loam about 10 inches thick. The upper part is very dark grayish brown, and the lower part is dark grayish brown and mottled. The subsoil is about 37 inches thick. It is mottled. In sequence downward, it is dark grayish brown, friable silty clay loam; grayish brown, firm silty clay loam; light brownish gray, firm silty clay loam; light brownish gray, friable silt loam; and dark grayish brown, very friable, stratified fine sandy loam and loamy fine sand. The underlying material to a depth of 60 inches or more is light brownish gray, mottled, friable silt loam. In some places the upper part of the subsurface layer is light colored. In a few areas the stratified loamy material is at a depth of more than 60 inches. In some areas the subsoil contains more clay. In other areas the soil contains more sand throughout.

Included with this soil in mapping are small areas of the well drained Plano and Proctor soils. These soils are in higher positions on the landscape than those of the Thorp soil. They make up 1 to 5 percent of the unit.

Water and air move through the upper part of the Thorp soil at a slow rate and through the lower part at a moderately rapid rate. Surface runoff is slow to ponded in cultivated areas. The seasonal high water table ranges from 0.5 foot above to 2.0 feet below the surface during spring. Available water capacity is high. The content of organic matter also is high. The shrink-swell potential is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

If properly managed, this soil is suited to corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Using a system of conservation tillage that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings, the

Figure 15.—Ponding in an area of Thorp silt loam.

ponding, the seasonal high water table, and the shrink-swell potential are management concerns. Diverting surface water or constructing the building on raised fill material helps to overcome the ponding. Subsurface tile drains and surface inlet tile drains help to lower the water table. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the ponding, the seasonal high water table, and the restricted permeability are management concerns. Surface and subsurface drains help to remove excess surface water. Also, grading and land shaping help to remove excess surface water. Adding several feet of suitable fill material helps to overcome the ponding and the restricted permeability. Enlarging the absorption area also helps to overcome the restricted permeability.

The land capability classification is IIw.

244—Hartsburg silty clay loam. This nearly level, poorly drained soil is in low areas and drainageways on uplands. It is occasionally ponded for brief periods in spring. Individual areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is black, friable silty clay loam about 8 inches thick. The subsurface layer is very dark gray, mottled, friable silty clay loam about 8 inches thick. The subsoil is about 22 inches thick. It is mottled. The upper part is grayish brown, friable silty clay loam; the next part is grayish brown, friable, calcareous silty clay loam; and the lower part is light olive gray and yellowish brown, friable, calcareous silt loam. The underlying material to a depth of 60 inches or more is light olive gray, mottled, friable, calcareous silt loam. In some areas the depth to free carbonates is more than 35 inches. In other areas the surface layer and subsurface layer are calcareous.

Included with this soil in mapping are small areas of the somewhat poorly drained Ipava and well drained Tama soils. These soils are on slight rises above the Hartsburg soil. They make up 1 to 5 percent of the unit.

Water and air move through the Hartsburg soil at a moderate rate. Surface runoff is slow to ponded in cultivated areas. The seasonal high water table ranges from 0.5 foot above to 2.0 feet below the surface during spring. Available water capacity is very high. The content of organic matter is high. The surface layer may become compact and cloddy if it is tilled when too wet. The shrink-swell potential is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

If properly managed, this soil is suited to corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Using a system of conservation tillage that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings, the ponding and the shrink-swell potential are management concerns. Diverting surface water or constructing the building on raised fill material helps to overcome the ponding. Subsurface tile drains and surface inlet tile drains help to lower the water table. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the ponding and the restricted permeability are management concerns. Surface and subsurface drains help to control the ponding. Also, grading and land shaping help to remove excess surface water. Adding several feet of suitable fill material helps to overcome the ponding and the restricted permeability. Enlarging the absorption area also helps to overcome the restricted permeability.

The land capability classification is IIw.

266—Disco sandy loam. This nearly level, well drained soil is on stream terraces. Individual areas are irregular in shape and range from 3 to 700 acres in size.

Typically, the surface soil is very dark grayish brown, friable sandy loam about 26 inches thick. The subsoil is about 20 inches thick. The upper part is dark brown, friable sandy loam; the next part is brown, friable sandy loam; and the lower part is stratified, brown, very friable loamy sand and dark yellowish brown, loose sand. The underlying material to a depth of 60 inches or more is dark yellowish brown, loose sand. In some places the upper part of the surface soil is loamy sand. In some areas, the surface soil is thinner and the upper part of the subsoil is lighter colored. In other areas the soil contains more clay.

Included with this soil in mapping are small areas of the somewhat excessively drained Ade, somewhat poorly drained Ridgeville, and excessively drained Sparta soils. Ade and Sparta soils are on rises above the Disco soil. Ridgeville soils are lower on the landscape than the Disco soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Disco soil at a rapid rate. Surface runoff is slow. Available water capacity is moderate. The content of organic matter also is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops. If irrigated, it is well suited to cultivated crops. It is well suited to use as a site for dwellings. It is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, soil blowing and the moderate available water capacity are management concerns. Using a system of conservation tillage that leaves crop residue on the surface and establishing field windbreaks conserve soil moisture and help to prevent excessive soil loss and the damage caused by windblown soil particles. Returning crop residue to the soil helps to maintain tilth and fertility.

If this soil is used as a site for septic tank absorption fields, a poor filtering capacity is a limitation. The soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the contamination of ground water. Filling or mounding with suitable material can increase the filtering capacity of the field.

The land capability classification is IIIs.

271D2—Timula silt loam, 10 to 18 percent slopes, eroded. This strongly sloping, well drained soil is on upland side slopes. Individual areas are linear or irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is mixed dark brown and dark yellowish brown, friable silt loam about 5 inches thick. The subsoil is dark yellowish brown, friable silt loam about 17 inches thick. The underlying material extends to a depth of 60 inches or more. It is calcareous. The upper part is yellowish brown, friable silt loam, and the lower part is light yellowish brown, mottled, friable silt. In some areas slopes are less than 10 percent or more than 18 percent. In other areas the subsoil contains more clay.

Included with this soil in mapping are small areas of the loamy Alvin and Fayette soils, the moderately well drained Arenzville soils, and the calcareous Bold soils. Alvin, Bold, and Fayette soils are in landscape positions similar to those of the Timula soil. Fayette soils contain more clay in the subsoil than the Timula soil. Arenzville soils are on flood plains. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Timula soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is very high. The content of organic matter is moderately low. In cultivated areas the surface layer tends to crust after hard rains.

Most areas are used for pasture and hay or are wooded, but some areas are cultivated. This soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay. It is moderately well suited to woodland. It is moderately suited to use as a site for dwellings or for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these helps to control erosion and maintain the productivity of the soil. Minimizing tillage and returning crop residue to the soil or regularly adding other organic material improve tilth and fertility.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as woodland, plant competition is a management concern. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

If this soil is used as a site for dwellings or for septic tank absorption fields, the slope is a limitation. Cutting, filling, and land shaping help to overcome this limitation on sites for dwellings. Installing the filter lines on the contour helps to overcome the slope on sites for septic tank absorption fields.

The land capability classification is IIIe.

272—Edgington silt loam. This nearly level, poorly drained soil is in depressions and drainageways on uplands and stream terraces. It is occasionally ponded for brief periods in spring. Individual areas are irregular in shape or linear and range from 3 to 300 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is friable silt loam about 16 inches thick. The upper part is very dark gray, the next part is dark grayish brown and mottled, and the lower part is grayish brown and mottled. The subsoil extends to a depth of more than 60 inches. It is mottled. In sequence downward, it is dark grayish brown, friable silty clay loam; grayish brown, firm silty clay loam; light brownish gray, firm silty clay loam; and light brownish gray, friable silt loam. In some places the upper part of the subsurface layer is lighter colored. In some areas the subsoil contains more clay. In other areas the lower part of the subsoil is sandy. A few places have as much as 20 inches of recently deposited, light-colored soil material.

Included with this soil in mapping are small areas of the somewhat poorly drained Ipava and Lawndale soils. These soils are on slight rises above the Edgington soil. They make up 1 to 10 percent of the unit.

Water and air move through the Edgington soil at a slow rate. Surface runoff is slow to ponded in cultivated areas. The seasonal high water table ranges from 0.5 foot above to 2.0 feet below the surface during spring. Available water capacity is very high. The content of organic matter is moderate. The shrink-swell potential also is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

If properly managed, this soil is suited to corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Using a system of conservation tillage that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, help to prevent surface compaction and crusting, and increase the rate of water infiltration.

If this soil is used as a site for dwellings, the ponding and the shrink-swell potential are management concerns. Diverting surface water or constructing the building on raised fill material helps to overcome the ponding. Subsurface tile drains and surface inlet tile drains help to lower the water table. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the ponding and the restricted permeability are management concerns. Surface and subsurface drains help to remove excess surface water. Also, grading and land shaping help to remove excess surface water. Adding several feet of suitable fill material helps to overcome the ponding and the restricted permeability. Enlarging the absorption area also helps to overcome the restricted permeability.

The land capability classification is IIw.

280B—Fayette silt loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on ridges in the uplands and on stream terraces. Individual areas are irregular in shape or linear and range from 3 to 120 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 7 inches thick. The subsurface layer is dark brown and dark yellowish brown, friable silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is dark yellowish brown, friable silt loam; the next part is dark yellowish brown, firm and friable silty clay loam; and the lower part is dark yellowish brown, friable silt loam. In some areas the surface layer is darker. In other areas the seasonal high water table is at a depth of 4 to 6 feet.

Included with this soil in mapping are small areas of the poorly drained Edgington soils. These soils are in depressions and drainageways below the Fayette soil. They make up 1 to 5 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is very high. The content of organic matter is moderately low. In cultivated areas the surface layer tends to crust after hard rains. The shrink-swell potential is moderate.

Most areas are cultivated, but some areas are used for pasture and hay or are wooded. This soil is well suited to cultivated crops and to pasture and hay. It is moderately well suited to woodland. It is moderately suited to use as a site for dwellings. It is well suited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these helps to control erosion. Returning crop residue to the soil or regularly adding other organic material improves tilth and fertility.

If this soil is used for pasture and hay, overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Proper stocking rates, pasture rotation, and timely deferment of grazing help to control erosion. Applications of fertilizer and lime help to keep the pasture in good condition.

If this soil is used as woodland, plant competition is a management concern. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

280C2—Fayette silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on ridges and side slopes in the uplands and on stream terraces. Individual areas are linear or irregular in shape and range from 3 to 160 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 8 inches thick. It contains some dark yellowish brown subsoil material. The subsoil is about 36 inches thick. The upper part is dark yellowish brown, friable silty clay loam; the next part is dark yellowish brown, friable silt loam; and the lower part is yellowish brown, friable silt loam. The underlying material to a depth of 60 inches or more is yellowish brown, friable silt loam. In some places the surface layer is silty clay loam because of severe erosion. In some areas the soil is calcareous at a depth of less than 40 inches. In other areas the underlying material is sandy.

Included with this soil in mapping are small areas of the loamy Alvin and moderately well drained Arenzville soils. Alvin soils are in landscape positions similar to those of the Fayette soil. Arenzville soils are in drainageways. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is very high. The content of organic matter is moderately low. The shrink-swell potential is moderate.

Most areas are cultivated, but some areas are used for pasture and hay or are wooded. This soil is moderately suited to cultivated crops. It is well suited to pasture and hay. It is moderately well suited to woodland. It is moderately suited to use as a site for dwellings. It is well suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain,

further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these helps to control erosion and maintain the productivity of the soil. Minimizing tillage and returning crop residue to the soil or regularly adding other organic material improve tilth and fertility.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer and lime are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as woodland, plant competition is a management concern. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

280D2—Fayette silt loam, 10 to 18 percent slopes, eroded. This strongly sloping, well drained soil is on side slopes in the uplands and on stream terraces. Individual areas are linear or irregular in shape and range from 3 to 60 acres in size.

Typically, the surface layer is dark grayish brown and dark brown, friable silt loam about 8 inches thick. It contains some dark yellowish brown subsoil material. The subsoil is dark yellowish brown, friable silty clay loam and silt loam about 45 inches thick. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable silt loam. In some areas the subsoil contains less clay. In other areas the soil is calcareous at a depth of less than 40 inches. In places the underlying material is sandy.

Included with this soil in mapping are small areas of the loamy Alvin and moderately well drained Arenzville soils. Alvin soils are in landscape positions similar to those of the Fayette soil. Arenzville soils are in drainageways below the Fayette soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is very high. The content of organic matter is moderately low. The shrink-swell potential is moderate.

Most areas are wooded or are used for pasture and hay, but some areas are cultivated. This soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay and moderately well suited to woodland. It is moderately suited to use as a site for dwellings or for septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that is dominated by a forage crop, a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these helps to control erosion and maintain the productivity of the soil. Minimizing tillage and returning crop residue to the soil or regularly adding other organic material improve tilth and fertility.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer and lime are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as woodland, plant competition is a management concern. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

If this soil is used as a site for dwellings, the slope and the shrink-swell potential are limitations. Cutting, filling, and land shaping help to overcome the slope. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The slope is a limitation if this soil is used as a site for septic tank absorption fields. Installing the filter lines on the contour or cutting and land shaping help to overcome this limitation.

The land capability classification is IVe.

280D3—Fayette silty clay loam, 7 to 15 percent slopes, severely eroded. This strongly sloping, well drained soil is on side slopes in the uplands and on stream terraces. In most areas, water erosion has

removed most of the original surface layer and tillage has mixed the rest with the upper part of the subsoil. Individual areas are linear or irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is dark brown, friable silty clay loam about 8 inches thick. The subsoil is about 38 inches thick. The upper part is dark yellowish brown, friable silty clay loam, and the lower part is dark yellowish brown and yellowish brown, friable silt loam. The underlying material to a depth of 60 inches or more is yellowish brown, friable, calcareous silt loam. In some areas the surface layer is silt loam. In other areas the soil is calcareous at a depth of less than 40 inches.

Included with this soil in mapping are small areas of the moderately well drained Arenzville and calcareous Bold soils. Arenzville soils are in drainageways. Bold soils are on side slopes below the Fayette soil. Included soils make up 1 to 5 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is very high. The content of organic matter is low. The shrink-swell potential is moderate.

Most areas are cultivated, but some areas are used for pasture and hay. This soil is poorly suited to cultivated crops. It is well suited to pasture and hay. It is moderately suited to use as a site for dwellings or for septic tank absorption fields.

Unless the surface is protected, further erosion is a severe hazard in areas used for corn, soybeans, or small grain. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, a crop rotation that is dominated by forage crops, or a combination of these helps to control erosion. Tilling when the soil is wet causes surface cloddiness, compaction, excessive runoff, and erosion. Returning crop residue to the soil and regularly adding other organic material increase the rate of water infiltration and improve tilth.

Establishing pasture and hay crops helps to keep soil loss within tolerable limits. Seedbed preparation is difficult on severely eroded side slopes where the subsoil is exposed. A no-till method of pasture renovation or seeding helps to control further erosion. The plants should not be grazed until they are sufficiently established. Proper stocking rates, rotation grazing, timely deferment of grazing, and applications of fertilizer and lime help to keep the pasture in good condition and prevent surface compaction and excessive runoff.

If this soil is used as a site for dwellings, the slope and the shrink-swell potential are limitations. Cutting, filling, and land shaping help to overcome the slope. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The slope is a limitation if this soil is used as a site for septic tank absorption fields. Installing the filter lines on the contour or cutting and land shaping help to overcome this limitation.

The land capability classification is IVe.

280F—Fayette silt loam, 18 to 30 percent slopes. This steep, well drained soil is on upland side slopes. Individual areas are linear or irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsurface layer is dark brown, friable silt loam about 5 inches thick. The subsoil is about 36 inches thick. The upper part is dark yellowish brown, friable silt loam; the next part is dark yellowish brown, friable silty clay loam; and the lower part is yellowish brown, friable silt loam. The underlying material to a depth of 60 inches or more is yellowish brown, friable silt loam. In some areas the subsoil contains less clay. In other areas the soil is calcareous within a depth of 40 inches.

Included with this soil in mapping are small areas of the loamy Alvin, moderately well drained Arenzville, and calcareous Hamburg soils. Alvin soils are in landscape positions similar to those of the Fayette soil. Arenzville soils are on flood plains. Hamburg soils are in landscape positions below the Fayette soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is rapid. Available water capacity is very high. The content of organic matter is moderately low.

Most areas are wooded or are used for pasture. This soil is moderately suited to pasture. It is moderately well suited to woodland. Because of the slope, it is unsuited to cultivated crops and to use as a site for dwellings or for septic tank absorption fields.

Erosion control is needed when grasses and legumes are established in the pastured areas. In areas where the pasture is established, no-till interseeding of legumes and seeding on the contour improve forage quality and help to control erosion. A permanent cover of pasture plants helps to control erosion and maintains tilth. Operating machinery is difficult on the steeper slopes. Selection of suitable species for planting, proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer and lime help to keep the pasture in good condition.

If this soil is used as woodland, the erosion hazard and the equipment limitation are management concerns because of the slope. Plant competition also is a management concern. Logging roads and skid trails

should be on or near the contour. On the steeper slopes, the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Equipment should be used only during periods when the soil is firm enough to support a load. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The land capability classification is Vle.

374—Proctor silt loam, sandy substratum. This nearly level, well drained soil is on rises on stream terraces. Individual areas are irregular in shape and range from 3 to 120 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is very dark grayish brown and dark brown, friable silt loam about 8 inches thick. The subsoil is about 33 inches thick. It is brown and dark yellowish brown throughout. In sequence downward, it is friable silty clay loam, friable clay loam, friable loam, and very friable sandy loam. The underlying material to a depth of 60 inches or more is brown, loose coarse sand. In places the underlying material contains more clay. In a few areas the seasonal high water table is at a depth of 4 to 6 feet. In other areas the sandy underlying material is less than 40 inches deep. In some places the loamy part of the subsoil is at a depth of more than 40 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Elburn and loamy Onarga soils. Elburn soils are in lower positions on the landscape than those of the Proctor soil. Onarga soils are in landscape positions similar to those of the Proctor soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the upper part of the Proctor soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is slow. Available water capacity is high. The content of organic matter is moderate. The shrink-swell potential also is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops. It is well suited to use as a site for dwellings with basements or for septic tank absorption fields. It is moderately suited to use as a site for dwellings without basements.

No major limitations affect the use of this soil for corn, soybeans, or small grain. Returning crop residue to the soil helps to maintain tilth and fertility.

The shrink-swell potential is a management concern in areas used for dwellings without basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is I.

379A—Dakota fine sandy loam, 0 to 2 percent slopes. This nearly level, well drained soil is on slight rises on stream terraces and uplands. Individual areas are irregular in shape and range from 3 to 2,300 acres in size.

Typically, the surface layer is very dark grayish brown, friable fine sandy loam about 9 inches thick. The subsurface layer is dark brown, friable loam about 9 inches thick. The subsoil is about 18 inches thick. The upper part is brown, friable loam; the next part is dark yellowish brown, friable clay loam; and the lower part is yellowish brown, friable sandy loam. The underlying material to depth of 60 inches or more is yellowish brown, loose fine sand and loamy sand. In some areas the upper part of the soil contains less clay or less sand. In other areas the upper part of the subsoil is darker. In places the sandy underlying material is more than 40 inches deep.

Included with this soil in mapping are small areas of the somewhat excessively drained Ade, somewhat poorly drained Ridgeville, and poorly drained Udolpho soils. Ade soils are on ridges above the Dakota soil. Ridgeville soils are in lower positions on the landscape than those of the Dakota soil. Udolpho soils are in depressions below the Dakota soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the upper part of the Dakota soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is slow. Available water capacity is moderate. The content of organic matter also is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops. If irrigated, it is well suited to cultivated crops. It is well suited to use as a site for dwellings. It is poorly suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, soil blowing and the moderate available water capacity are management concerns. Using a system of conservation tillage that leaves crop residue on the surface and establishing field windbreaks conserve soil moisture and help to prevent excessive soil loss and the damage caused by windblown soil particles. Returning crop residue to the soil helps to maintain tilth and fertility.

If this soil is used as a site for septic tank absorption fields, a poor filtering capacity is a limitation. The soil readily absorbs but does not adequately filter the

effluent from septic tanks. The poor filtering capacity can result in the contamination of ground water. Filling or mounding with suitable material can increase the filtering capacity of the field.

The land capability classification is IIs.

379B—Dakota fine sandy loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on ridges and side slopes on stream terraces and uplands. Individual areas are irregular in shape or linear and range from 3 to 60 acres in size.

Typically, the surface layer is very dark grayish brown, friable fine sandy loam about 8 inches thick. The subsurface layer is very dark grayish brown, friable loam about 5 inches thick. The subsoil is about 25 inches thick. The upper part is dark brown, friable loam; the next part is dark yellowish brown, friable loam; and the lower part is brown, very friable loamy sand. The underlying material extends to a depth of 60 inches or more. The upper part is brown, loose, stratified coarse sand and loamy coarse sand, and the lower part is strong brown, loose, stratified sand and loamy sand. In a few places the soil contains less clay. In some areas the upper part of the soil contains less sand and more silt. In other areas the sandy underlying material is more than 40 inches deep.

Included with this soil in mapping are small areas of the somewhat excessively drained Ade and excessively drained Sparta soils. These soils are in landscape positions similar to those of the Dakota soil. They make up 1 to 10 percent of the unit.

Water and air move through the upper part of the Dakota soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. The content of organic matter also is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops. If irrigated, it is well suited to cultivated crops. It is well suited to pasture and hay and to use as a site for dwellings. It is poorly suited to septic tank absorption fields.

In areas used for corn, soybeans, or small grain, water erosion, soil blowing, and the moderate available water capacity are management concerns. Using a system of conservation tillage that leaves crop residue on the surface and establishing field windbreaks help to control water erosion and soil blowing and conserve soil moisture. Returning crop residue to the soil helps to maintain tilth and fertility.

If this soil is used as a site for septic tank absorption fields, a poor filtering capacity is a limitation. The soil readily absorbs but does not adequately filter the effluent from septic tanks. The poor filtering capacity can result in the contamination of ground water. Filling or mounding with suitable material can increase the filtering capacity of the field.

The land capability classification is IIe.

430B—Raddle silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on upland foot slopes. Individual areas are linear or irregular in shape and range from 3 to 100 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is friable silt loam about 14 inches thick. The upper part is very dark grayish brown, and the lower part is dark brown. The subsoil to a depth of 60 inches or more is friable silt loam. The upper part is dark brown, and the lower part is dark yellowish brown. In some areas the upper part of the subsoil is darker. In other areas the subsoil contains more clay. In a few places the slope is less than 2 percent.

Included with this soil in mapping are small areas of the loamy Onarga soils. These soils are in landscape positions similar to those of the Raddle soil. They make up 1 to 5 percent of the unit.

Water and air move through the Raddle soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is very high. The content of organic matter is moderate.

Most areas are cultivated, but some areas are used for pasture and hay. This soil is well suited to cultivated crops and to pasture and hay. It is well suited to use as a site for dwellings or for septic tank absorption fields.

In areas used for corn, soybeans, or small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these helps to control erosion. Returning crop residue to the soil helps to maintain tilth and fertility.

If this soil is used for pasture and hay, overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Proper stocking rates, pasture rotation, and timely deferment of grazing help to control erosion. Applications of fertilizer and lime help to keep the pasture in good condition.

The land capability classification is IIe.

447—Canisteo loam, sandy substratum. This nearly level, poorly drained, calcareous soil is in low areas on stream terraces. Individual areas are irregular in shape and range from 3 to 600 acres in size.

Typically, the surface layer is black, friable loam about 10 inches thick. The subsurface layer is very dark gray, friable loam about 4 inches thick. The subsoil is about 34 inches thick. It is mottled. In sequence downward, it is dark gray, friable loam; gray and grayish

brown, friable clay loam; light gray, friable loam; and dark grayish brown, friable sandy loam. The underlying material to a depth of 60 inches or more is brown, mottled, loose sand. In some areas the soil contains less sand. In a few places the underlying material contains more clay.

Included with this soil in mapping are small areas of the very poorly drained Palms, somewhat poorly drained Ridgeville, and poorly drained Selma soils. These soils are not calcareous. Palms soils are organic. They are in lower positions on the landscape than those of the Canisteo soil. Ridgeville soils are on slight rises above the Canisteo soil. Selma soils are in landscape positions similar to those of the Canisteo soil. Included soils make up 1 to 5 percent of the unit.

Water and air move through the upper part of the Canisteo soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is slow. The seasonal high water table is within a depth of 1 foot during winter and spring. Available water capacity is high. The content of organic matter also is high.

Most areas are cultivated. This soil is well suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

If properly managed, this soil is suited to corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile generally function satisfactorily if suitable outlets are available. No applications of lime are needed. Minimizing tillage and returning crop residue to the soil can improve tilth, prevent surface compaction and crusting, increase the rate of water infiltration, and maintain productivity.

If this soil is used as a site for dwellings or for septic tank absorption fields, the seasonal high water table is a limitation. Installing underground drains helps to lower the water table. In areas used for septic tank absorption fields, adding several feet of suitable fill material increases the depth to the seasonal high water table.

The land capability classification is IIw.

683—Lawndale silt loam. This nearly level, somewhat poorly drained soil is on uplands. Individual areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 39 inches thick. The upper part is mottled brown and dark grayish brown, friable silty clay loam; the next part is light olive brown, mottled, friable silty clay loam and silt loam; and the lower part is dark yellowish brown, very friable loamy fine sand. The underlying material to a depth of 60 inches or more is yellowish brown, loose fine sand. In some areas the lower part of the subsoil and the underlying material are silt loam. In other areas the depth to the sandy underlying material is less than 40 inches.

Included with this soil in mapping are small areas of the well drained Broadwell and Pillot soils and the poorly drained Edgington and Sable soils. Broadwell and Pillot soils are on rises above the Lawndale soil. Edgington and Sable soils are in drainageways and depressions below the Lawndale soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the upper part of the Lawndale soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is slow. The seasonal high water table is at a depth of 1 to 3 feet during spring. Available water capacity is high. The content of organic matter also is high. The shrink-swell potential is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops and to pasture and hay. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. The seasonal high water table can delay planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. A system of conservation tillage that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing subsurface tile drains near the foundations helps to overcome the wetness. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table is a limitation. Subsurface tile drains lower the water table.

The land capability classification is I.

684A—Broadwell silt loam, 0 to 2 percent slopes. This nearly level, well drained soil is on ridges in the uplands. Individual areas are irregular in shape and range from 3 to 120 acres in size.

Typically, the surface soil is very dark grayish brown, friable silt loam about 14 inches thick. The subsoil is about 39 inches thick. In sequence downward, it is dark brown, friable silty clay loam; dark yellowish brown, friable silty clay loam and silt loam; dark yellowish brown, friable fine sandy loam; and dark yellowish brown, very friable loamy fine sand. The underlying material to a depth of 60 inches or more is yellowish

brown, loose fine sand. In places the lower part of the subsoil and the underlying material are silt loam. In a few areas the seasonal high water table is at a depth of 4 to 6 feet. In other areas the sandy underlying material is at a depth of less than 40 inches.

Included with this soil in mapping are small areas of the poorly drained Edgington and loamy Onarga soils. Edgington soils are in depressions and drainageways below the Broadwell soil. Onarga soils are in landscape positions similar to those of the Broadwell soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the upper part of the Broadwell soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is slow. Available water capacity is high. The content of organic matter is moderate. The shrink-swell potential also is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops and to pasture and hay. It is moderately suited to use as a site for dwellings. It is well suited to septic tank absorption fields.

No major limitations affect the use of this soil for corn, soybeans, or small grain. Returning crop residue to the soil helps to maintain tilth and fertility.

In areas used for pasture, including grasses and legumes in the cropping sequence helps to maintain tilth. Selection of suitable species for planting, proper stocking rates, applications of fertilizer and lime, and restricted use during wet periods help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is I.

684B—Broadwell silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on upland ridges and side slopes. Individual areas are irregular in shape or linear and range from 3 to 280 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is dark brown, friable silt loam about 5 inches thick. The subsoil extends to a depth of more than 60 inches. In sequence downward, it is dark brown, friable silty clay loam; dark yellowish brown, friable silty clay loam; yellowish brown, friable loam; and yellowish brown, very friable loamy fine sand. In some areas the soil does not have a subsurface layer. In other areas the depth to the sandy part of the subsoil is less than 40 inches. In places the lower part of the subsoil is silt loam. In a few areas the slope is less than 2 percent.

Included with this soil in mapping are small areas of the somewhat excessively drained Ade, poorly drained Edgington, and loamy Onarga soils. Ade and Onarga soils are in landscape positions similar to those of the Broadwell soil. Edgington soils are in drainageways and depressions below the Broadwell soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the upper part of the Broadwell soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is high. The content of organic matter is moderate. The shrink-swell potential also is moderate.

Most areas are cultivated, but some areas are used for pasture and hay. This soil is well suited to cultivated crops and to pasture and hay. It is moderately suited to use as a site for dwellings. It is well suited to septic tank absorption fields.

In areas used for corn, soybeans, or small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these helps to control erosion. Returning crop residue to the soil helps to maintain tilth and fertility.

In areas used for pasture and hay, overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the hazard of erosion. Proper stocking rates, pasture rotation, and timely deferment of grazing help to control erosion. Applications of fertilizer and lime help to keep the pasture in good condition.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

684C2—Broadwell silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on ridges and side slopes in the uplands. Individual areas are linear or irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. It contains some dark brown subsoil material. The subsoil extends to a depth of 60 inches or more. In sequence downward, it is dark brown and dark yellowish brown, friable silty clay loam; dark yellowish brown, friable silty clay loam and silt loam; yellowish brown, friable silt loam; yellowish brown, very friable fine sandy loam and loamy fine sand; and yellowish brown, loose loamy fine sand and fine sand. In a few areas the lower part of the profile is silt loam. In some places the depth to the sandy part of the subsoil is less than 40 inches. In other

places the surface layer is silty clay loam and is lighter colored because of severe erosion.

Included with this soil in mapping are small areas of the somewhat excessively drained Ade, poorly drained Edgington, and loamy Onarga soils. Ade and Onarga soils are in landscape positions similar to those of the Broadwell soil. Edgington soils are in drainageways or in nearly level areas below the Broadwell soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the upper part of the Broadwell soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is high. The content of organic matter is moderate. The shrink-swell potential also is moderate.

Most areas are cultivated, but some areas are used for pasture and hay. This soil is moderately suited to cultivated crops. It is well suited to pasture and hay. It is moderately suited to use as a site for dwellings. It is well suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface, a crop rotation in which close-growing grasses and legumes are grown for 1 year or more, contour farming, terraces, or a combination of these helps to control erosion and thus maintain the productivity of the soil. Minimizing tillage and returning crop residue to the soil help to maintain tilth and fertility.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer and lime are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

685C2—Middletown silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on upland ridges and side slopes. Individual areas are linear or irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 3 inches thick. The subsurface layer is dark brown, friable silt loam about 4 inches thick. It contains some brown subsoil material. The subsoil extends to a depth of 60 inches or more. It is brown and dark yellowish brown. The upper part is friable silt loam and silty clay loam, the next part is friable fine sandy loam, and the lower part is very friable loamy fine sand. In some areas the surface layer is silty clay loam because of severe erosion. In other areas the depth to the sandy part of the subsoil is less than 40 inches. In places the middle and lower parts of the subsoil contain less sand and more silt.

Included with this soil in mapping are small areas of the loamy Alvin and moderately well drained Arenzville soils. Alvin soils are in landscape positions similar to those of the Middletown soil. Arenzville soils are in drainageways below the Middletown soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the upper part of the Middletown soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is high. The content of organic matter is moderately low. The shrink-swell potential is moderate.

Most areas are cultivated, but some areas are used for pasture and hay or are wooded. This soil is moderately suited to cultivated crops. It is well suited to pasture and hay. It is moderately well suited to woodland. It is moderately suited to use as a site for dwellings. It is well suited to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation that includes 1 or more years of forage crops, a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these helps to control erosion and maintain the productivity of the soil. Minimizing tillage and returning crop residue to the soil or regularly adding other organic material improve tilth and fertility.

Adapted forage and hay plants grow well on this soil. Timely deferment of grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer and lime are needed. The plants should not be grazed or clipped until they are sufficiently established.

If this soil is used as woodland, plant competition is a management concern. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree

roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Extending the footings below the subsoil or reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

770—Udolpho fine sandy loam. This nearly level, poorly drained soil is in depressions and low areas on stream terraces. It is occasionally ponded for brief periods in spring. Individual areas are irregular in shape and range from 3 to 520 acres in size.

Typically, the surface layer is very dark grayish brown, friable fine sandy loam about 9 inches thick. The subsurface layer is grayish brown, friable fine sandy loam about 5 inches thick. The subsoil is about 17 inches thick. It is mottled. The upper part is grayish brown, friable sandy clay loam, and the lower part is light brownish gray, friable fine sandy loam. The underlying material extends to a depth of 60 inches or more. It is mottled. The upper part is light gray and yellowish brown, loose fine sand, and the lower part is grayish brown, loose, stratified loamy sand and sand. In places the upper part of the subsoil contains less clay. In a few areas the sandy underlying material is at a depth of more than 40 inches. In other areas the surface layer is thicker.

Included with this soil in mapping are small areas of the somewhat poorly drained Ridgeville and Watseka soils. These soils are on slight rises above the Udolpho soil. They make up 1 to 5 percent of the unit.

Water and air move through the upper part of the Udolpho soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is slow to ponded in cultivated areas. The seasonal high water table ranges from 0.5 foot above to 2.0 feet below the surface during winter and spring. Available water capacity is moderate. The content of organic matter also is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

If properly managed, this soil is suited to corn soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Using a system of conservation tillage that leaves crop residue on the surface after planting and returning crop residue to the soil help to prevent surface compaction and crusting and increase the rate of water infiltration.

If this soil is used as a site for dwellings, the ponding is a management concern. Diverting surface water or constructing the building on raised fill material helps to overcome the ponding. Subsurface tile drains and surface inlet tile drains help to lower the water table.

If this soil is used as a site for septic tank absorption fields, the ponding and a hazard of ground-water contamination are management concerns. Installing surface and subsurface drains and grading and land shaping help to control the ponding. Adding several feet of suitable fill material increases the depth to the seasonal high water table, increases the filtering capacity of the soil, and helps to prevent ground-water contamination.

The land capability classification is IIw.

772—Marshan loam. This nearly level, poorly drained soil is in broad, low areas on stream terraces. It is occasionally ponded for brief periods in spring. Individual areas are irregular in shape and range from 3 to 1,110 acres in size.

Typically, the surface layer is black, friable loam about 9 inches thick. The subsurface layer is black, mottled, friable loam about 6 inches thick. The subsoil is about 23 inches thick. It is mottled. The upper part is dark gray, friable loam, and the lower part is grayish brown, friable loam. The underlying material to a depth of 60 inches or more is grayish brown, loose sand. In places the upper part of the soil contains less clay. In a few areas the depth to the sandy underlying material is more than 40 inches. In other areas the subsurface layer is lighter colored. In some places the lower part of the soil contains carbonates.

Included with this soil in mapping are small areas of the somewhat excessively drained Ade soils, the well drained Onarga soils, and the somewhat poorly drained Ridgeville and Watseka soils. These soils are on slight rises above the Marshan soil. They make up 1 to 10 percent of the unit.

Water and air move through the upper part of the Marshan soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is slow to ponded in cultivated areas. The seasonal high water table ranges from 0.5 foot above to 2.0 feet below the surface during winter and spring. Available water capacity is moderate. The content of organic matter is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is poorly suited to use as a site for dwellings or for septic tank absorption fields.

If properly managed, this soil is suited to corn, soybeans, and small grain. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile, and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Using a system of

conservation tillage that leaves crop residue on the surface after planting and returning crop residue to the soil help to prevent surface compaction and crusting and increase the rate of water infiltration.

If this soil is used as a site for dwellings, the ponding is a management concern. Diverting surface water or constructing the building on raised fill material helps to overcome the ponding. Subsurface tile drains and surface inlet tile drains help to lower the water table.

If this soil is used as a site for septic tank absorption fields, the ponding and a hazard of ground-water contamination are management concerns. Installing surface and subsurface drains and grading and land shaping help to control the ponding. Adding several feet of suitable fill material increases the depth to the seasonal high water table, increases the filtering capacity of the soil, and helps to prevent ground-water contamination.

The land capability classification is IIw.

965D2—Tallula-Bold complex, 7 to 15 percent slopes, eroded. This map unit consists of strongly sloping, well drained soils on upland side slopes. Individual areas are linear or irregular in shape and range from 3 to 410 acres in size. They are about 50 to 60 percent Tallula soil and 40 to 50 percent Bold soil. The Tallula soil is below the Bold soil on the side slopes. The two soils occur as areas so intricately mixed or so small that it is not practical to map them separately.

Typically, the surface layer of the Tallula soil is dark brown, friable silt loam about 7 inches thick. The subsoil is friable silt loam about 25 inches thick. The upper part is mixed dark yellowish brown and dark brown, the next part is brown, and the lower part is yellowish brown and calcareous. The underlying material to a depth of 60 inches or more is yellowish brown, friable, calcareous silt. In places the surface layer is thicker. In some areas the soil is calcareous at a depth of more than 35 inches. In other areas the soil contains more clay.

Typically, the surface layer of the Bold soil is dark grayish brown, friable, calcareous silt loam about 7 inches thick. The underlying material to a depth of 60 inches or more is friable silt. The upper part is brown, and the lower part is yellowish brown. In places the soil contains more sand.

Included with these soils in mapping are small areas of the moderately well drained Arenzville soils. These included soils are in drainageways below the Tallula and Bold soils. They make up 1 to 5 percent of the unit.

Water and air move through the Tallula and Bold soils at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is very high. The content of organic matter is moderate in the Tallula soil and moderately low in the Bold soil.

Most areas are cultivated, but some areas are used for pasture and hay. These soils are moderately suited to cultivated crops and to pasture and hay. They are moderately suited to use as sites for dwellings or for septic tank absorption fields.

If these soils are used for corn, soybeans, or small grain, further erosion is a hazard. A crop rotation dominated by forage crops, a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these helps to keep soil losses within tolerable limits. Stripcropping also helps to control erosion. Returning crop residue to the soil and regularly adding other organic material help to maintain tilth and improve fertility.

Adapted forage and hay plants grow well on these soils. Timely deferment of grazing helps to prevent surface compaction and excessive runoff and reduces the hazard of erosion. Tilling on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion. Using a no-till system of seeding also helps to control erosion. Applications of fertilizer are needed. The plants should not be grazed or clipped until they are sufficiently established.

If these soils are used as sites for dwellings or septic tank absorption fields, the slope is a limitation. Cutting, filling, and land shaping help to overcome this limitation on sites for dwellings. Installing the filter lines on the contour helps to overcome the slope on sites for septic tank absorption fields.

The land capability classification is IIIe.

1070—Beaucoup silty clay loam, wet. This nearly level, poorly drained soil is on flood plains. It is frequently flooded for long periods in spring. Individual areas are irregular in shape and range from 3 to 800 acres in size.

Typically, the surface soil is very dark gray, mottled, friable silty clay loam about 19 inches thick. The subsoil is dark gray, mottled, friable silty clay loam about 16 inches thick. The underlying material to a depth of 60 inches or more is dark gray, mottled, firm silty clay loam. In some places the soil contains more sand. In other places the surface soil is thicker.

Water and air move through this soil at a moderately slow rate. Surface runoff is slow to ponded. The seasonal high water table ranges from 0.5 foot above to 2.0 feet below the surface during spring. Available water capacity is high. The content of organic matter also is high.

Most areas are wooded. This soil is moderately suited to woodland and to woodland wildlife habitat. It is well suited to wetland wildlife habitat. Because the soil

is subject to flooding and ponding, it is unsuited to cultivated crops and to use as a site for dwellings or for septic tank absorption fields.

If this soil is used as woodland, the equipment limitation, seedling mortality, and windthrow are management concerns because of the wetness. Plant competition is an additional management concern. Equipment should be used only during periods when the soil is firm enough to support a load. The seedling mortality rate can be reduced by planting on ridges, by selecting planting stock that is older and larger than is typical, or by mulching. Some replanting may be needed. Using harvesting methods that do not isolate the remaining trees or leave them widely spaced reduces the windthrow hazard. Only high-value trees should be removed from a strip 50 feet wide along the west and south edges of the woodland. The plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

Trees and shrubs can be easily established on this soil. The existing stands of trees provide good habitat for woodland wildlife. Protecting the woodland from fire and from grazing livestock helps to prevent the depletion of shrubs and sprouts, which provide food for wildlife.

This soil provides good habitat for wetland wildlife. Many shallow water areas and wild herbaceous and wetland plants are available. Some of the wildlife attracted to these areas are ducks, geese, shore birds, muskrats, frogs, turtles, and snakes.

The land capability classification is Vw.

1166—Cohoctah loam, wet. This nearly level, poorly drained soil is on flood plains. It is frequently flooded for long periods in winter and spring (fig. 16). Individual areas are linear or irregular in shape and range from 3 to 800 acres in size.

Typically, the surface layer is very dark gray, friable loam about 8 inches thick. The subsurface layer is very dark gray, friable sandy loam about 6 inches thick. The subsoil is about 22 inches thick. It is mottled. The upper part is dark gray, friable fine sandy loam; the next part is light brownish gray, friable fine sandy loam; and the lower part is grayish brown, friable sandy loam. The underlying material to a depth of 60 inches or more is grayish brown, mottled, friable fine sandy loam. In some areas the soil does not have a subsurface layer. In other areas the soil contains more clay. In some places the soil is flooded for shorter periods.

Included with this soil in mapping are small areas of the moderately well drained Medway soils. These soils are in higher positions on the landscape than those of the Cohoctah soil. They make up 1 to 5 percent of the unit.

Water and air move through the Cohoctah soil at a moderately rapid rate. Surface runoff is very slow. The seasonal high water table is within a depth of 1 foot during winter and spring. Available water capacity is high. The content of organic matter is moderate.

Most areas are wooded. This soil is moderately well suited to woodland. It is moderately suited to woodland wildlife habitat. It is well suited to wetland wildlife habitat. Because the soil is subject to flooding and is undrained, it is unsuited to cultivated crops and to use as a site for dwellings or for septic tank absorption fields.

If this soil is used as woodland, the equipment limitation, seedling mortality, and windthrow are management concerns because of the wetness. Plant competition also is a management concern. Equipment should be used only during periods when the soil is firm enough to support a load. The seedling mortality rate can be reduced by planting on ridges, by selecting planting stock that is older and larger than is typical, or by mulching. Some replanting may be needed. Using harvesting methods that do not isolate the remaining trees or leave them widely spaced reduces the windthrow hazard. Only high-value trees should be removed from a strip 50 feet wide along the west and south edges of the woodland. The plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

Trees and shrubs can be easily established on this soil. The existing stands of trees provide good habitat for woodland wildlife. Protecting the woodland from fire and from grazing livestock helps to prevent the depletion of shrubs and sprouts, which provide food for wildlife.

This soil provides good habitat for wetland wildlife. Many shallow water areas and wild herbaceous and wetland plants are available. Some of the wildlife attracted to these areas are ducks, geese, shore birds, muskrats, frogs, turtles, and snakes.

The land capability classification is Vw.

1201—Gilford sandy loam, wet. This nearly level, poorly drained soil is in low areas and depressions on stream terraces. It is frequently ponded for long periods

Figure 16.—Flooding in an area of Cohoctah loam, wet.

in winter and spring. Individual areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface soil is black, friable sandy loam about 16 inches thick. The subsoil is about 24 inches thick. It is mottled. The upper part is dark gray, friable sandy loam, and the lower part is alternating bands of dark gray, friable sandy loam and loam. The underlying material to a depth of 60 inches or more is mottled gray and dark gray, loose sand. In some areas the subsoil contains more clay. In other areas the lower part of the surface soil is lighter colored. In places the upper part of the subsoil is darker.

Included with this soil in mapping are small areas of the somewhat poorly drained Ridgeville soils. These soils are on slight rises above the Gilford soil. They make up 1 to 5 percent of the unit.

Water and air move through the Gilford soil at a rapid rate. Surface runoff is slow to ponded. The seasonal high water table ranges from 0.5 foot above to 1.0 foot below the surface during winter and spring. Available water capacity is moderate. The content of organic matter also is moderate.

In most areas this soil supports native wetland plants and is used as habitat for wetland wildlife. Because it is not drained, the soil is unsuited to cultivated crops, to pasture and hay, or to use as a site for dwellings or for septic tank absorption fields.

This soil is well suited to wetland plants and provides habitat for wetland wildlife. The native plant species provide food and cover for wetland wildlife, such as ducks, muskrats, and shore birds. Shallow water areas for waterfowl can easily be developed. Protection from fire and from grazing livestock is essential.

The land capability classification is Vw.

3088B—Sparta loamy sand, 1 to 5 percent slopes, frequently flooded. This gently sloping, excessively drained soil is on rises on flood plains. It is frequently flooded for brief periods in spring. Individual areas are irregular in shape and range from 3 to 50 acres in size.

Typically, the surface layer is very dark grayish brown, very friable loamy sand about 8 inches thick. The subsurface layer is very friable loamy sand about 14 inches thick. The upper part is very dark grayish brown, and the lower part is dark brown. The subsoil is brown and dark yellowish brown, very friable sand about 17 inches thick. The underlying material to a depth of 60 inches or more is dark yellowish brown, loose sand. In some areas the soil does not have a subsurface layer. In other areas the upper part of the subsoil is darker.

Included with this soil in mapping are small areas of the well drained Landes and moderately well drained Medway soils. These soils are in slightly lower positions on the landscape than those of the Sparta soil. They make up 1 to 10 percent of the unit.

Water and air move through the Sparta soil at a rapid rate. Surface runoff is slow. Available water capacity is low. The content of organic matter also is low.

Most areas are cultivated. This soil is poorly suited to cultivated crops. Because of the flooding, it is unsuited to use as a site for dwellings or for septic tank absorption fields.

Flooding is not a serious problem affecting the commonly grown crops because it generally occurs early in spring. Some areas, however, are inaccessible to farm machinery, and planting is delayed because of flooding in the lower areas. Soil blowing, the low available water capacity, and low fertility are management concerns. Using a system of conservation tillage that leaves crop residue on the surface and establishing field windbreaks help to control soil blowing and conserve soil moisture. Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and improves fertility.

The land capability classification is IVs.

3107—Sawmill silty clay loam, frequently flooded. This nearly level, poorly drained soil is on flood plains. It is frequently flooded for brief periods in spring. Individual areas are irregular in shape or linear and range from 3 to 40 acres in size.

Typically, the surface layer is black, firm silty clay loam about 8 inches thick. The subsurface layer is black, friable silty clay loam about 17 inches thick. The subsoil to a depth of 60 inches or more is mottled, friable silty clay loam. The upper part is very dark gray, the next part is dark gray, and the lower part is gray. In some places the subsurface layer is thinner or thicker. In other places the soil contains more sand. Some areas have as much as 20 inches of recently deposited material.

Included with this soil in mapping are small areas of the moderately well drained Medway and somewhat poorly drained Tice soils. These soils are in slightly higher positions on the landscape than those of the Sawmill soil. They make up 1 to 10 percent of the unit.

Water and air move through the Sawmill soil at a moderate rate. Surface runoff is slow. The seasonal high water table is within a depth of 2 feet during spring. Available water capacity is high. Generally, the content of organic matter also is high. The surface layer may become compact and cloddy if it is tilled when too wet.

Most areas are cultivated, but some areas are used for pasture and hay. This soil is moderately suited to cultivated crops and to pasture and hay. Because of the flooding, it is unsuited to use as a site for dwellings or for septic tank absorption fields.

If properly managed, this soil is suited to soybeans, corn, or small grain. Flooding is a hazard and occurs frequently during the growing season. Measures that maintain or improve the drainage system are needed. The content of organic matter varies widely in the surface layer. Subsurface tile functions satisfactorily if suitable outlets are available. Basing application rates of herbicides and pesticides on actual organic matter content reduces the risk of ground-water contamination. Using a system of conservation tillage that leaves crop residue on the surface after planting and returning crop residue to the soil improve tilth, prevent surface compaction and crusting, and increase the rate of water infiltration.

If this soil is used for pasture and hay, the flooding and the seasonal high water table are management concerns. Subsurface tile drains help to lower the water table. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

The land capability classification is IIIw.

3107+—Sawmill silt loam, overwash, frequently flooded. This nearly level, poorly drained soil is on flood plains. It is frequently flooded for brief periods in spring. Individual areas are irregular in shape or linear and range from 3 to 120 acres in size.

Typically, the surface layer is very dark grayish brown and dark brown, friable silt loam overwash about 12 inches thick. The subsurface layer is mottled, friable silty clay loam about 26 inches thick. The upper part is very dark gray, and the lower part is very dark grayish

brown. The subsoil to a depth of 60 inches or more is mottled, friable silty clay loam. The upper part is dark gray, and the lower part is grayish brown. In some areas the subsurface layer is thinner or thicker. In other areas the soil contains more sand. Some places do not have silt loam overwash. In a few areas the overwash is sandy.

Included with this soil in mapping are small areas of the moderately well drained Medway and somewhat poorly drained Tice soils. These soils are in slightly higher positions on the landscape than those of the Sawmill soil. They make up 1 to 10 percent of the unit.

Water and air move through the Sawmill soil at a moderate rate. Surface runoff is slow. The seasonal high water table is within a depth of 2 feet during spring. Available water capacity is high. The content of organic matter generally is moderate.

Most areas are cultivated, but some areas are used for pasture and hay. This soil is moderately suited to cultivated crops. Because of the flooding, it is unsuited to use as a site for dwellings or for septic tank absorption fields.

If properly managed, this soil is suited to soybeans, corn, and small grain. Flooding is a hazard during the growing season. Measures that maintain or improve the drainage system are needed. Subsurface tile functions satisfactorily if suitable outlets are available. The content of organic matter varies widely in the surface soil. Basing application rates of herbicides and pesticides on actual organic matter content reduces the risk of ground-water contamination. Using a system of conservation tillage that leaves crop residue on the surface after planting and returning crop residue to the soil help to prevent surface compaction and crusting and increase the rate of water infiltration.

If this soil is used for pasture and hay, the flooding and the seasonal high water table are management concerns. Subsurface tile drains help to lower the water table. Overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

The land capability classification is IIIw.

3115—Dockery silty clay loam, frequently flooded. This nearly level, somewhat poorly drained soil is on flood plains. It is frequently flooded for long periods in spring. Individual areas are irregular in shape and range from 10 to 1,200 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark grayish brown, friable silty clay loam about 9 inches thick. The underlying material to a depth of 60 inches or more is stratified dark grayish brown, grayish brown, and very dark grayish brown, friable silt loam and silty clay loam. In some areas the surface layer contains more sand. In other areas the soil contains less clay. In places the seasonal high water table is within a depth of 2 feet.

Water and air move through this soil at a moderate rate. Surface runoff is slow. The seasonal high water table is at a depth of 2 to 3 feet during spring. Available water capacity is very high. The content of organic matter is moderate.

Most areas are wooded, but some areas are cultivated. This soil is poorly suited to cultivated crops. It is moderately well suited to woodland and well suited to woodland wildlife habitat. It is moderately suited to wetland wildlife habitat. Because of the flooding, it is unsuited to use as a site for dwellings or for septic tank absorption fields.

Flooding frequently delays planting of the commonly grown crops. It sometimes occurs during the growing season and causes crop damage and lower yields. Returning crop residue to the soil can help to maintain tilth and fertility.

If this soil is used as woodland, protection from fire and from grazing livestock is essential. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

The dense stands of timber provide good habitat for woodland wildlife. This soil is suitable for grain and seed crops, wild herbaceous plants, and hardwoods. Measures that protect the habitat from fire and from grazing livestock help to prevent the depletion of shrubs and sprouts, which provide food for wildlife.

This soil provides fair habitat for wetland wildlife. Many shallow water areas are available. Also available are grain and seed crops, wild herbaceous plants, wetland plants, and other important habitat elements. Some of the wildlife attracted to these areas are ducks, geese, shore birds, muskrats, frogs, turtles, and snakes.

The land capability classification is IVw.

3284—Tice silty clay loam, frequently flooded. This nearly level, somewhat poorly drained soil is on flood plains. It is frequently flooded for brief periods in spring. Individual areas are irregular in shape and range from 3 to 240 acres in size.

Typically, the surface layer is very dark gray, friable silty clay loam about 9 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsoil to a depth of 60 inches or more is friable silt loam. The upper part is dark brown, and the lower part is dark grayish brown and mottled. In some areas the surface layer and subsurface layer are thicker. In other areas the soil contains more sand. In

some places the soil is flooded for longer periods.

Included with this soil in mapping are small areas of the poorly drained Ambraw and Sawmill soils. These soils are in slightly lower positions on the landscape than those of the Tice soil. They make up 1 to 15 percent of the unit.

Water and air move through the Tice soil at a moderate rate. Surface runoff is slow. The seasonal high water table is at a depth of 1.5 to 3.0 feet during spring. Available water capacity is very high. The content of organic matter is moderate. The surface layer may become compact and cloddy if it is tilled when too wet.

Most areas are cultivated, but some areas are wooded. This soil is moderately suited to cultivated crops. It is moderately well suited to woodland. Because of the flooding, it is unsuited to use as a site for dwellings or for septic tank absorption fields.

Flooding is not a serious problem affecting the commonly grown crops because it generally occurs early in spring. Some areas, however, are inaccessible to farm machinery, and planting is delayed because of flooding in the lower areas. The seasonal high water table can delay planting and reduce productivity in some areas. Subsurface drainage helps to lower the water table. Minimizing tillage and leaving crop residue on the surface after planting improve tilth and maintain fertility.

If this soil is used as woodland, plant competition is a management concern. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The land capability classification is IIIw.

3302—Ambraw clay loam, frequently flooded. This nearly level, poorly drained soil is on flood plains. It is frequently flooded for brief periods in spring. Individual areas are irregular in shape and range from 6 to 30 acres in size.

Typically, the surface layer is black, friable clay loam about 9 inches thick. The subsurface layer is very dark gray and very dark grayish brown, friable loam about 14 inches thick. The subsoil is about 23 inches thick. It is mottled. The upper part is dark grayish brown, friable loam, and the lower part is dark grayish brown, firm clay loam. The underlying material to a depth of 60 inches or more is dark grayish brown, mottled, firm clay loam. In some places the upper part of the subsoil is darker. In other places the soil contains less sand or less clay.

Included with this soil in mapping are small areas of the moderately well drained Medway soils. These soils are in slightly higher positions on the landscape than those of the Ambraw soil. They make up 1 to 10 percent of the unit.

Water and air move through the Ambraw soil at a moderate rate. Surface runoff is slow. The seasonal high water table is within a depth of 2 feet during spring. Available water capacity is high. The content of organic matter is moderate. The surface layer may become compact and cloddy if it is tilled when too wet.

Most areas are cultivated. This soil is moderately suited to cultivated crops. Because of the flooding, it is unsuited to use as a site for dwellings or for septic tank absorption fields.

If properly managed, this soil is suited to the commonly grown crops. Flooding occurs frequently during the growing season. Measures that maintain or improve the drainage system are needed. Subsurface tile functions satisfactorily if suitable outlets are available. Returning crop residue to the soil improves tilth and maintains fertility.

The land capability classification is IVw.

3304—Landes sandy loam, frequently flooded. This nearly level, well drained soil is on rises on flood plains. It is frequently flooded for brief periods in spring. Individual areas are irregular in shape and range from 3 to 140 acres in size.

Typically, the surface soil is very dark grayish brown, friable sandy loam about 14 inches thick. The subsoil is friable sandy loam about 23 inches thick. The upper part is dark brown, and the lower part is dark yellowish brown. The underlying material extends to a depth of 60 inches or more. The upper part is brown, loose, stratified loamy sand and sand, and the lower part is brown, loose sand. In some areas the surface soil is thicker. In other areas the surface soil is thinner and lighter colored. In some places the soil contains more clay.

Included with this soil in mapping are small areas of the moderately well drained Medway and excessively drained, frequently flooded Sparta soils. Medway soils are in slightly lower positions on the landscape than those of the Landes soil. Sparta soils are in slightly higher positions on the landscape than those of the Landes soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the Landes soil at a rapid rate. Surface runoff is slow. Available water capacity is moderate. The content of organic matter is moderately low.

Most areas are cultivated, but some areas are wooded. This soil is moderately suited to cultivated crops. It is well suited to woodland. Because of the flooding, it is unsuited to use as a site for dwellings or for septic tank absorption fields.

Flooding is not a serious problem affecting the commonly grown crops because it generally occurs early in spring. Some areas, however, are inaccessible to farm machinery, and planting is delayed because of flooding in the lower areas. Minimizing tillage and leaving crop residue on the surface after planting or regularly adding other organic material help to maintain tilth and improve fertility.

If this soil is used as woodland, plant competition is a management concern. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The land capability classification is IIIw.

3682—Medway silty clay loam, frequently flooded. This nearly level, moderately well drained soil is on flood plains. It is frequently flooded for brief periods in spring. Individual areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface layer is very dark gray, friable silty clay loam about 5 inches thick. The subsurface layer is black, friable silty clay loam about 6 inches thick. The subsoil is about 31 inches thick. It is mottled. The upper part is dark grayish brown, friable silt loam, loam, and clay loam, and the lower part is dark brown and dark yellowish brown, friable clay loam. The underlying material to a depth of 60 inches or more is yellowish brown, mottled, friable clay loam. In some areas the upper part of the subsoil is darker. In other areas the soil contains less sand. In some places the soil is flooded for longer periods.

Included with this soil in mapping are small areas of the poorly drained Ambraw, Beaucoup, and Sawmill soils. These soils are in slightly lower positions on the landscape than those of the Medway soil. They make up 1 to 10 percent of the unit.

Water and air move through the Medway soil at a moderate rate. Surface runoff is slow. A seasonal high water table is at a depth of 1.5 to 3.0 feet during spring. Available water capacity is high. The content of organic matter also is high.

Most areas are cultivated or are wooded. This soil is moderately suited to cultivated crops. It is moderately well suited to woodland and well suited to woodland wildlife habitat. Because of the flooding, it is unsuited to use as a site for dwellings or for septic tank absorption fields.

Flooding is not a serious problem affecting the commonly grown crops because it generally occurs early in spring. Some areas, however, are inaccessible to farm machinery, and planting is delayed because of flooding in the lower areas. Minimizing tillage and leaving crop residue on the surface after planting help to maintain tilth and fertility.

If this soil is used as woodland, plant competition is a management concern. In openings where timber has been harvested, competition from undesirable vegetation can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

Trees and shrubs can be easily established on this soil. The existing stands of trees provide good habitat for woodland wildlife. Protecting the woodland from fire and from grazing livestock helps to prevent the depletion of shrubs and sprouts, which provide food for wildlife.

The land capability classification is IIw.

8070—Beaucoup silty clay loam, occasionally flooded. This nearly level, poorly drained soil is on flood plains. It is occasionally flooded for brief periods in spring. Individual areas are irregular in shape and range from 3 to 320 acres in size.

Typically, the surface layer is very dark gray, friable silty clay loam about 10 inches thick. The subsurface layer is very dark gray, mottled, friable silty clay loam about 7 inches thick. The subsoil is mottled, friable silty clay loam about 28 inches thick. The upper part is dark gray, the next part is olive gray, and the lower part is light olive gray and yellowish brown. The underlying material to a depth of 60 inches or more is light olive gray, mottled, friable silty clay loam. In some areas the upper part of the subsoil is darker. In other areas the soil contains less clay or more sand. Some places have as much as 20 inches of recent, light-colored, silt loam overwash.

Water and air move through this soil at a moderately slow rate. Surface runoff is slow to ponded in cultivated areas. The seasonal high water table ranges from 0.5 foot above to 2.0 feet below the surface during spring. Available water capacity is high. The content of organic matter also is high.

Most areas are cultivated. This soil is well suited to

Figure 17.—This levee helps to control flooding in an area of Beaucoup silty clay loam, occasionally flooded.

cultivated crops. Because of the flooding, it is unsuited to use as a site for dwellings or for septic tank absorption fields.

If this soil is sufficiently drained and adequately protected from flooding, it is suitable for the commonly grown crops (fig. 17). Measures that maintain or improve the drainage system are needed. Tile drains and surface drains function satisfactorily if suitable outlets are available. Returning crop residue to the soil improves tilth and maintains fertility.

The land capability classification is IIw.

8078—Arenzville silt loam, occasionally flooded. This nearly level, moderately well drained soil is on flood plains. It is occasionally flooded for brief periods in spring. Individual areas are irregular in shape or linear and range from 5 to 120 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 9 inches thick. The underlying material is stratified, friable silt loam about 21 inches thick. The upper part is dark brown and brown, and the lower part is dark grayish brown and dark brown. A buried surface soil extends to a depth of 60 inches or more. It is mottled. The upper part is very dark gray, friable silt loam; the next part is black, friable silty clay loam; and the lower part is very dark gray, friable silty clay loam. In some areas the underlying material is thinner. In other areas the buried soil is at a lower depth. In some

places the surface layer is darker and thicker. In a few places the surface layer and the underlying material are calcareous.

Included with this soil in mapping are small areas of the poorly drained Beaucoup and Sawmill soils. These soils are in slightly lower positions on the landscape than those of the Arenzville soil. They make up 1 to 10 percent of the unit.

Water and air move through the Arenzville soil at a moderate rate. Surface runoff is slow. The seasonal high water table is at a depth of 3 to 6 feet during spring. Available water capacity is very high. The content of organic matter is moderately low. In cultivated areas the surface layer tends to crust after hard rains.

Most areas are cultivated, but some areas are used for pasture and hay. This soil is well suited to cultivated crops and to pasture and hay. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

This soil is adequately protected from flooding for the commonly grown crops. Using a system of conservation tillage that leaves crop residue on the surface or regularly adding other organic material improves tilth and fertility and increases the rate of water infiltration.

If this soil is used for pasture and hay, overgrazing causes surface compaction and poor tilth. Proper stocking rates, rotation grazing, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. The flooding delays harvesting of hay in some years.

The land capability classification is IIw.

8088B—Sparta loamy fine sand, 1 to 5 percent slopes, occasionally flooded. This gently sloping, excessively drained soil is on rises on flood plains. It is occasionally flooded for brief periods in spring. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is very dark gray, very friable loamy fine sand about 9 inches thick. The subsurface layer is very dark grayish brown, very friable loamy fine sand about 12 inches thick. The subsoil is about 21 inches thick. The upper part is dark brown, very friable loamy fine sand, and the lower part is dark yellowish brown, very friable fine sand. The underlying material to a depth of 60 inches or more is loose sand. The upper part is yellowish brown, and the lower part is light yellowish brown. In some areas the soil does not have a subsurface layer. In other areas the upper part of the subsoil is darker.

Included with this soil in mapping are small areas of the well drained Landes and somewhat poorly drained Riley soils. These soils are in slightly lower positions on the landscape than those of the Sparta soil. They make up 1 to 10 percent of the unit.

Water and air move through the Sparta soil at a rapid rate. Surface runoff is slow. Available water capacity is low. The content of organic matter also is low.

Most areas are cultivated. This soil is poorly suited to cultivated crops. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

This soil is adequately protected from flooding for the commonly grown crops. Soil blowing, the low available water capacity, and low fertility are management concerns. Using a system of conservation tillage that leaves crop residue on the surface and establishing field windbreaks help to control soil blowing and conserve soil moisture. Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and improves fertility.

The land capability classification is IVs.

8107—Sawmill silty clay loam, occasionally flooded. This nearly level, poorly drained soil is on flood plains. It is occasionally flooded for brief periods in spring. Individual areas are irregular in shape or linear and range from 3 to 400 acres in size.

Typically, the surface layer is black, firm silty clay loam about 5 inches thick. The subsurface layer is friable silty clay loam about 21 inches thick. The upper part is black, and the lower part is very dark gray and mottled. The subsoil is dark gray, mottled, friable silty clay loam about 22 inches thick. The underlying material to a depth of 60 inches or more is multicolored, friable silty clay loam. In some places the subsurface layer is thinner. In other places the upper part of the subsoil is darker. In some areas the soil contains more sand. A few areas have as much as 20 inches of recent, light-colored, silt loam overwash.

Included with this soil in mapping are small areas of the moderately well drained Arenzville and somewhat poorly drained Riley soils. These soils are in slightly higher positions on the landscape than those of the Sawmill soil. They make up 1 to 10 percent of the unit.

Water and air move through the Sawmill soil at a moderate rate. Surface runoff is slow. The seasonal high water table is within a depth of 2 feet during spring. Available water capacity is high. Generally, the content of organic matter also is high. The surface layer may become compact and cloddy if it is tilled when too wet.

Most areas are cultivated. This soil is well suited to cultivated crops. Because of the flooding, it is unsuited to use as a site for dwellings or for septic tank absorption fields.

If this soil is sufficiently drained and adequately

protected from flooding, it is suitable for the commonly grown crops. The seasonal high water table is a limitation. The content of organic matter varies widely in the surface layer. Measures that maintain or improve the drainage system are needed. Subsurface tile functions satisfactorily if suitable outlets are available. Basing application rates of herbicides and pesticides on actual organic matter content reduces the risk of ground-water contamination. Returning crop residue to the soil improves tilth and maintains fertility.

The land capability classification is IIw.

8107+—Sawmill silt loam, overwash, occasionally flooded. This nearly level, poorly drained soil is on flood plains. It is occasionally flooded for brief periods in spring. Individual areas are irregular in shape or linear and range from 3 to 120 acres in size.

Typically, the surface layer is dark brown, friable silt loam overwash about 10 inches thick. The next 4 inches is stratified dark brown, very dark gray, and yellowish brown, friable silt loam overwash. Below this to a depth of 60 inches or more is a buried soil of silty clay loam. The upper part is a black, friable surface layer; the next part is a very dark gray, mottled, friable and firm subsurface layer; and the lower part is a dark gray, mottled, firm subsoil. In some places the buried subsurface layer is thinner, and in other places it is thicker. In places the soil contains more sand. Some areas do not have a silt loam overwash. In a few areas the overwash is sandy.

Included with this soil in mapping are small areas of the moderately well drained Arenzville and somewhat poorly drained Riley soils. These soils are slightly higher on the landscape than the Sawmill soil. They make up 1 to 10 percent of the unit.

Water and air move through the Sawmill soil at a moderate rate. Surface runoff is slow. The seasonal high water table is within a depth of 2 feet during spring. Available water capacity is high. The content of organic matter generally is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops. Because of the flooding, it is unsuited to use as a site for dwellings or for septic tank absorption fields.

If this soil is sufficiently drained and adequately protected from flooding, it is suitable for the commonly grown crops. Measures that maintain or improve the drainage system are needed. Subsurface tile functions satisfactorily if suitable outlets are available. The content of organic matter varies widely in the surface layer. Basing application rates of herbicides and pesticides on the actual organic matter content reduces the risk of ground-water contamination. Returning crop residue to the soil helps to maintain tilth and fertility.

The land capability classification is IIw.

8284—Tice silty clay loam, occasionally flooded. This nearly level, somewhat poorly drained soil is on flood plains. It is occasionally flooded for brief periods in spring. Individual areas are irregular in shape and range from 3 to 120 acres in size.

Typically, the surface soil is very dark gray, friable silty clay loam about 13 inches thick. The subsoil extends to a depth of 60 inches or more. It is mottled. The upper part is very dark grayish brown and dark grayish brown, friable silty clay loam, and the lower part is dark grayish brown, friable silt loam. In some areas the upper part of the subsoil is darker. In other areas the soil contains more sand. A few places have as much as 20 inches of recent, light-colored overwash.

Included with this soil in mapping are small areas of the poorly drained Ambraw, Beaucoup, and Sawmill soils. These soils are in slightly lower positions on the landscape than those of the Tice soil. They make up 1 to 15 percent of the unit.

Water and air move through the Tice soil at a moderate rate. Surface runoff is slow. The seasonal high water table is at a depth of 1.5 to 3.0 feet during spring. Available water capacity is very high. The content of organic matter is moderate. The surface layer may become compact and cloddy if it is tilled when too wet.

Most areas are cultivated. This soil is well suited to cultivated crops. Because of the flooding, it is unsuited to use as a site for dwellings or for septic tank absorption fields.

If this soil is adequately protected from flooding, it is suitable for the commonly grown crops. The seasonal high water table may delay planting and reduce productivity in some areas. Subsurface drainage can lower the high water table. Returning crop residue to the soil or regularly adding other organic material improves tilth and maintains fertility.

The land capability classification is IIw.

8302—Ambraw clay loam, occasionally flooded. This nearly level, poorly drained soil is on flood plains. It is occasionally flooded for brief periods in spring. Individual areas are irregular in shape and range from 3 to 120 acres in size.

Typically, the surface layer is very dark gray, firm clay loam about 9 inches thick. The subsurface layer is very dark grayish brown, friable clay loam about 6 inches thick. The subsoil is about 34 inches thick. It is mottled. The upper part is dark grayish brown, friable clay loam; the next part is grayish brown, friable clay loam; and the lower part is friable, stratified dark gray

loam and grayish brown sandy loam. The underlying material to a depth of 60 inches or more is mottled grayish brown, light brownish gray, and strong brown, loose, stratified loam, loamy sand, and sand. In some areas the upper part of the subsoil is darker. In other areas the soil contains less sand or less clay.

Included with this soil in mapping are small areas of the somewhat poorly drained Riley soils. These soils are in slightly higher positions on the landscape than those of the Ambraw soil. They make up 1 to 10 percent of the unit.

Water and air move through the Ambraw soil at a moderately slow rate. Surface runoff is slow. The seasonal high water table is within a depth of 2 feet during spring. Available water capacity is high. The content of organic matter is moderate. The surface layer may become compact and cloddy if it is tilled when too wet.

Most areas are cultivated. This soil is well suited to cultivated crops. Because of the flooding, it is unsuited to use as a site for dwellings or for septic tank absorption fields.

If this soil is sufficiently drained and adequately protected from flooding, it is suitable for the commonly grown crops. Measures that maintain or improve the drainage system are needed. Subsurface tile functions satisfactorily if suitable outlets are available. Returning crop residue to the soil improves tilth and maintains fertility.

The land capability classification is IIw.

8304—Landes fine sandy loam, occasionally flooded. This nearly level, well drained soil is on rises on flood plains. It is occasionally flooded for brief periods in spring. Individual areas are irregular in shape and range from 3 to 20 acres in size.

Typically, the surface soil is very dark grayish brown, friable fine sandy loam about 21 inches thick. The subsoil is friable fine sandy loam about 19 inches thick. The upper part is dark brown, and the lower part is dark yellowish brown. The underlying material to a depth of 60 inches or more is dark yellowish brown and yellowish brown, loose loamy sand and sand. In some areas the upper part of the subsoil is darker. In other areas the surface soil is thinner. In a few places the soil contains more clay.

Included with this soil in mapping are small areas of the poorly drained Ambraw and somewhat poorly drained Riley soils. These soils are in slightly lower positions on the landscape than those of the Landes soil. They make up 1 to 10 percent of the unit.

Water and air move through the Landes soil at a rapid rate. Surface runoff is slow. Available water capacity is moderate. The content of organic matter is moderately low.

Most areas are cultivated. This soil is moderately suited to cultivated crops. Because of the flooding, it is unsuited to use as a site for dwellings or for septic tank absorption fields.

If this soil is adequately protected from flooding, it is suitable for the commonly grown crops. Returning crop residue to the soil or regularly adding other organic material helps to maintain tilth and improves fertility.

The land capability classification is IIw.

8400—Calco silt loam, occasionally flooded. This nearly level, poorly drained, calcareous soil is on flood plains. It is occasionally flooded for brief periods in spring. Individual areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is black, friable silt loam about 9 inches thick. The subsurface layer is about 22 inches thick. It is mottled. The upper part is black, friable silt loam, and the lower part is very dark gray, friable silty clay loam. The subsoil is light gray, mottled, friable silty clay loam about 6 inches thick. The underlying material to a depth of 60 inches or more is light gray, mottled, friable silt loam. In some areas the subsurface layer is thinner. In other areas the soil contains more sand.

Included with this soil in mapping are small areas of the poorly drained Ambraw, Beaucoup, and Sawmill soils. These soils do not have free carbonates in the solum. They are in landscape positions similar to those of the Calco soil. They make up 1 to 5 percent of the unit.

Water and air move through the Calco soil at a moderate rate. Surface runoff is slow. The seasonal high water table is within a depth of 2 feet during spring. Available water capacity is very high. The content of organic matter is high.

Most areas are cultivated. This soil is well suited to cultivated crops. Because of the flooding, it is unsuited to use as a site for dwellings or for septic tank absorption fields.

If this soil is sufficiently drained and adequately protected from flooding, it is suited to the commonly grown crops. Measures that maintain or improve the drainage system are needed. Subsurface tile functions satisfactorily if suitable outlets are available. Applications of lime are not needed. Returning crop residue to the soil helps to maintain tilth and fertility.

The land capability classification is IIw.

8452—Riley silt loam, occasionally flooded. This nearly level, somewhat poorly drained soil is on flood plains. It is occasionally flooded for brief periods in

spring. Individual areas are irregular in shape and range from 3 to 40 acres in size.

Typically, the surface layer is black, friable silt loam about 8 inches thick. The subsurface layer is about 7 inches thick. The upper part is very dark gray, friable silt loam, and the lower part is very dark grayish brown and dark brown, friable loam. The subsoil is about 20 inches thick. It is mottled. The upper part is stratified, multicolored, friable loam, and the lower part is yellowish brown, friable loam and sandy loam. The underlying material to a depth of 60 inches or more is yellowish brown, loose sand and coarse sand. In some places the subsurface layer is thicker. In other places the sandy underlying material is at a lower depth. In some areas the subsoil contains less sand. In other areas the underlying material contains as much as 15 percent gravel.

Included with this soil in mapping are small areas of the poorly drained Ambraw and well drained Landes soils. Ambraw soils are in lower positions on the landscape than those of the Riley soil. Landes soils are in slightly higher positions on the landscape than those of the Riley soil. Included soils make up 1 to 10 percent of the unit.

Water and air move through the upper part of the Riley soil at a moderate rate and through the lower part at a rapid rate. Surface runoff is slow. The seasonal high water table is at a depth of 1.5 to 3.0 feet in spring. Available water capacity is moderate. The content of organic matter also is moderate.

Most areas are used for cultivated crops. This soil is well suited to cultivated crops. It is unsuited to use as a site for dwellings or for septic tank absorption fields because of the flooding.

If this soil is adequately protected from flooding, it is suited to the commonly grown crops. The seasonal high water table can delay planting and reduce productivity in some areas. A subsurface drainage system can lower the water table. The available water capacity is a limitation during periods of low rainfall. Returning crop residue to the soil or regularly adding other organic material conserves soil moisture and helps to maintain tilth and fertility.

The land capability classification is IIw.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban or built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 215,900 acres in Mason County, or nearly 63 percent of the total acreage, meets the requirements for prime farmland. Associations 3, 4, 5, 6, 7, 8, and 10, which are described under the heading "General Soil Map Units," have the highest percentage of prime farmland.

The map units in Mason County that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Some soils that have a seasonal high water table and all soils that are frequently flooded during the growing season qualify as prime farmland only in areas where these limitations have been overcome by drainage measures or flood control. The need for these measures is indicated after the map unit name in table 5. Onsite evaluation is needed to determine whether or not these limitations have been overcome by corrective measures.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Natural Resources Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

In 1982, Mason County had about 268,724 acres of cropland and 5,517 acres of pasture *(12)*. The major row crops are corn and soybeans. Some seed corn is grown in the Mason City area. Winter wheat, spring wheat, and oats are the major small grain crops. Specialty crops, such as popcorn, pumpkins, melons, green beans, tomatoes, and other vegetables, also are grown. Alfalfa is the major forage crop.

The potential for continued crop production in Mason County is good, especially if the latest crop production technology is applied. The soils on the upland slopes and sandy stream terraces have good potential for increased forage production. This soil survey can assist in the application of crop production technology.

In areas used as cropland, management measures that control water erosion and soil blowing, remove excess water, control flooding, prevent droughtiness, and maintain or improve fertility and tilth are needed.

Water erosion is a potential problem on approximately 33 percent of the cropland in the county. Sheet and rill erosion is a problem on soils that have slopes of more than 2 percent, such as Broadwell, Fayette, Onarga, Pillot, and Tama soils.

Loss of the surface layer by sheet and rill erosion lowers the productive capacity of the soil. As the surface soil is removed, material from the subsoil is incorporated into the tilled layer. The subsoil generally has lower levels of plant nutrients and a lower content of organic matter and has a higher content of clay than the surface soil. As the content of organic matter in the tilled layer decreases and the content of clay increases,

Figure 18.—Grassed waterways remove excess water at a nonerosive velocity and help to prevent the formation of gullies.

soil tilth is reduced. As tilth deteriorates, the likelihood that a crust will form on the surface increases and the rate of water infiltration is reduced. Erosion on farmland results in the sedimentation of streams, rivers, lakes, and roadside ditches. Removing the sediment generally is expensive. Erosion control helps to prevent this pollution and improves the quality of water for agriculture, for municipal and recreational uses, and for fish and wildlife.

Measures that control sheet and rill erosion include several cultural and structural practices. Contour farming, contour stripcropping, and terraces are effective on the sloping Broadwell, Fayette, and Tama soils. A system of conservation tillage that leaves crop residue on the surface and a crop rotation that includes 1 or more years of close-growing grasses or legumes can be used on all of the soils in the county.

Gully erosion occurs in drainageways where concentrated runoff flows overland to an open ditch or stream. This type of erosion can be controlled by establishing grassed waterways or constructing grade-stabilization structures (fig. 18).

Soil blowing is a hazard on approximately 30 percent of the cropland in the county. It is a major hazard on soils that have a surface layer of very fine sandy loam or on soils that have a coarser surface texture and a

high amount of finely divided calcium carbonate in the surface layer. Bloomfield and Sparta soils are examples of sandy soils, and Harpster soils contain a high amount of calcium carbonate. Maintaining an adequate plant cover, leaving crop residue on the surface, and keeping the surface rough help to control soil blowing. Establishing windbreaks of suitable trees or shrubs also helps to control soil blowing.

Further information about erosion-control measures suitable for each kind of soil is provided in the "Technical Guide," which is available in local offices of the Natural Resources Conservation Service.

A drainage system is needed on approximately 40 percent of the cropland in the county. If the poorly drained soils are used for the crops commonly grown in the county, some type of drainage system is necessary. Typically, drainage ditches and subsurface drainage systems have been installed on poorly drained soils, such as those in the Marshan-Udolpho and Selma-Harpster associations. Drainage ditches provide an outlet for tile drains and provide a surface outlet for soils that have slow permeability. Tile drains that are installed in areas of sandy loam or coarser textured soils should be wrapped in filter blankets to keep out sand. Edgington and Thorp soils are examples of soils that have slow permeability and require surface intakes or drainage ditches to remove excessive surface water. Examples of poorly drained soils are Beaucoup, Drummer, Marshan, Selma, and Udolpho soils. In areas of somewhat poorly drained soils, such as Elburn, Ipava, Lawndale, and Tice soils, wetness can delay planting in some years. Drainage systems have been installed in most areas of these soils.

Flooding is a hazard in some areas of the county. Some soils are annually flooded by stream overflow. Others are flooded less frequently than once every 2 years. In areas that are subject to flooding, crop varieties that have a relatively short growing season should be selected. An extensive levee system has been constructed along the Sangamon River and Salt Creek, which are along the southern border of the county. The levees reduce the frequency of flooding in these areas.

Droughtiness limits the productivity of some of the sandy soils used for crops in the county, such as Bloomfield and Sparta soils. The physical composition of these soils limits the amount of water available for plant growth. The effects of droughtiness can be minimized by reducing the amount of runoff and increasing the water-holding capacity of the soils. Using a system of conservation tillage and returning crop residue and other organic material to the soil help to overcome the droughtiness. Crops that are not susceptible to drought, such as winter wheat, can be planted. Droughty soils can be converted to nonagricultural uses. Also, irrigation can reduce droughtiness.

Approximately 20 percent of the cropland in Mason County is irrigated *(12)*. Most irrigated areas are in associations 1, 2, 3, and 4. The most common irrigated crops are corn, soybeans, and specialty crops, such as melons, pumpkins, and tomatoes.

Center-pivot and water-cannon irrigation systems are the most common types of irrigation used in Mason County. Application of water by these methods can be carefully controlled to minimize water loss. Scheduling irrigation according to the stage of plant development, the time of year, and the water-holding capacity of the soil increases efficiency. Also, converting center-pivot systems from high pressure to low pressure and leaving crop residue on the surface reduce the rate of water evaporation and help to control runoff.

Using irrigation equipment on slopes of more than 3 percent can increase the risk of water erosion. Erosion-control practices that are used in nonirrigated areas also are effective in controlling erosion in the more sloping areas that are irrigated.

Soils in irrigated areas generally produce higher yields than the same soils in areas that are dry-farmed. Consequently, more plant nutrients are removed when the irrigated crops are harvested. Returning all crop residue to the soil, adding manure and other organic material, and applying commercial fertilizers can help to maintain soil fertility.

Most of the water used for irrigation in Mason County comes from underground aquifers. Typically, water wells are at a depth of 60 to 100 feet *(13)*. The water is generally of excellent quality for agricultural uses. Because of highly permeable soil materials and shallow aquifers, however, the potential for ground-water contamination by chemicals and waste products is high.

Natural fertility in the soils of Mason County ranges from very low to high. Fertility is very low in sandy soils, such as Plainfield soils, and is high in dark, silty soils, such as Drummer soils. In most of the soils in the county, reaction ranges from moderately acid to neutral. On acid soils, applications of ground limestone are needed to raise the pH to a level high enough for the optimum availability of plant nutrients. Calcareous soils, such as Canisteo and Harpster soils, have a naturally high pH and do not require applications of lime, but iron, potassium, and phosphorus are not readily available in these soils. Also, potassium is not readily available in sandy soils, such as Bloomfield and Sparta soils.

Three cultural practices can be used to maintain or improve soil fertility. First, planting legumes in rotation or as a cover crop adds nitrogen and organic matter to

the soil. Second, returning crop residue, manure, and other organic material to the soil increases the organic matter content. Organic matter increases the nutrient-holding capacity of the soil and supplies nutrients to growing plants. Third, commercial fertilizers can be used. On most of the soils in the county, crops respond well to applications of nitrogen, phosphorus, and potassium and certain micronutrients. Applications of fertilizer and manure should be based on the results of soil tests. The local office of the Cooperative Extension Service can help in determining the kinds and amounts of nutrients needed.

If fertilizer is applied, care should be taken to prevent the pollution of surface and subsurface water. Phosphorus and potassium fertilizers should not be applied in the fall on slopes of more than 5 percent unless measures that control runoff and erosion are used. Nitrogen fertilizers should not be applied in the fall. Using the proper formulation of nitrogen fertilizer, frequently applying small amounts of the nitrogen, according to the needs of the crop, and using a nitrogen inhibitor on poorly drained and sandy soils reduce losses of nitrogen caused by leaching and denitrification. Animal manure should not be applied to frozen soil on slopes of more than 5 percent. Incorporating the manure into the upper few inches of the soil immediately after application minimizes the loss of nitrogen.

Soil tilth is an important factor affecting the germination of seeds and the rate of water infiltration. Soils that have good tilth are granular and porous and have a high content of organic matter.

Poor tilth is a problem in areas of Fayette soils, which have a surface layer of silt loam that is low in organic matter content. Generally, the structure of these soils is weak, and a crust forms on the surface during periods of intense rainfall. This crust is hard when dry. It inhibits seedling emergence, reduces the rate of water infiltration, and increases runoff and erosion. Regular additions of crop residue, manure, and other organic material improve soil structure and minimize crusting. Poor tilth also is a problem on poorly drained soils that have a surface layer of silty clay loam, such as Sable and Sawmill soils. If these soils are plowed while wet, they become cloddy. The cloddiness makes it difficult to prepare a good seedbed. Tilling in the fall and leaving the surface rough generally result in good tilth in the spring. Leaving moderate amounts of crop residue on the surface helps to control soil blowing in these areas. A system of ridge tilling may also be effective on these soils.

Suitable pasture and hay plants include several legumes, cool-season grasses, and native warm-season grasses. Alfalfa is the most commonly grown legume used for hay. It is often used in mixtures with smooth bromegrass and orchardgrass. Alfalfa is best suited to well drained soils, such as Fayette and Alvin soils. Other legumes that are suitable for pastures are red clover and birdsfoot trefoil.

Kentucky bluegrass and smooth bromegrass are the most common grasses used for pasture. Other suitable cool-season grasses include timothy, orchardgrass, and reed canarygrass. These grasses can be used alone or in mixtures with adapted legumes. Native warm-season grasses, such as indiangrass, little bluestem, and switchgrass, grow very well in the summer. They require different management techniques from those used for cool-season grasses.

Measures that improve fertility and prevent overgrazing are needed in areas used for pasture. The amount of lime and fertilizer to be added should be based on the results of soil tests, the needs of the plants, and the expected level of yields. Overgrazing reduces plant vigor, reduces forage yields, and increases the hazard of erosion. Deferred grazing, rotation grazing, and proper stocking rates help to prevent overgrazing.

Yields per Acre

The average yields per acre that can be expected for the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents *(5)*. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management *(9)*. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit *(9)*. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of the map units is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Grant L. Haley, district forester, Illinois Division of Forest Resources, prepared this section.

Forest originally covered more than 50 percent of Mason County. As settlement and western expansion progressed, the original forest acreage of some 175,000 acres decreased, primarily because of clearing for agriculture. This trend has continued. Presently, the forest land in Mason County is only 13 percent of the total acreage, or approximately 45,600 acres.

The three basic woodland types represented in Mason County are bottom-land hardwoods, upland hardwoods, and sand oak.

The bottom-land hardwood woodland type covers approximately 8,200 acres in the county, or about 2 percent of the total land area (fig. 19). The bottom-land hardwoods are along large stream bottoms, primarily along the Illinois and Sangamon Rivers and Salt Creek. The predominant tree species are silver maple and cottonwood. American sycamore, bur oak, pin oak, river birch, green ash, pecan, and American elm are less common.

The upland hardwoods woodland type occurs primarily in the eastern half of Mason County. Approximately 13,800 acres of the forest land in the county consists of upland hardwoods. This acreage accounts for approximately 4 percent of the total area of the county. Upland hardwood species include white oak, black oak, northern red oak, hickories, basswood, white ash, red elm, American elm, black walnut, sugar maple, and black cherry.

Sand oak is a local term used to describe the oak-hickory forest type that grows primarily in areas of

Figure 19.—An area of hardwoods on bottom land.

Bloomfield and Plainfield soils. The sand oak forest type is chiefly in the western half of the county. It covers approximately 23,700 acres, or 7 percent of the total county area. The sand oak forest is characteristically 95 percent or more black oak and blackjack oak. The remaining 4 or 5 percent consists of three or four species of hickory. Other tree species included in the sand oak forest type, although uncommon, are white oak, black walnut, black cherry, and red elm.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or

rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; *F*, a high content of rock fragments in the soil; and *N*, snowpack. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, F, and N.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, and fire lanes and in log-handling areas. Forests that have been burned or overgrazed also are subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment and season of use are not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *volume*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It generally is the most common species on the soil and is the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife (fig. 20). Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility

Figure 20.—Windbreaks help to control soil blowing and provide habitat for wildlife.

of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

Mason County has several areas of scenic interest. These areas are used for hunting, fishing, sightseeing, hiking, camping, picnicking, boating, snowmobiling,

cross-country skiing, or horseback riding.

Public lands available for recreation are the state-owned Sanganois Conservation Area and the Sand Ridge State Forest and the federally owned Chautauqua National Wildlife Refuge.

Municipalities offer a range of recreational facilities. There also are several private recreational facilities along the Illinois River and its backwaters.

The suitability of the soils in Mason County for the development of additional recreational facilities is good to poor. The best suited soils are in associations 3, 6, 7, and 8, which are described under the heading "General Soil Map Units."

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Debbie Scott, private lands wildlife habitat biologist, Illinois Department of Conservation, prepared this section.

Although wildlife habitat is generally a secondary land use in many parts of Mason County, the overall quality of available habitat is good. This is partly because of the variety of cropland uses in the county and partly because of the sizable number of wetland and woodland areas and areas that are left idle because the soil is not suitable for crops or timber production.

A majority of the soil associations in the county include habitat for openland wildlife. Major wildlife species in these openland areas are ringneck pheasant, quail, cottontail rabbits, coyotes, meadowlarks, dickcissels, and field sparrows. Much of the land in areas of openland wildlife habitat is cropland. The quality of this type of habitat is generally good in Mason County because of the cover crops planted in corners of nonirrigated fields, the extensive planting of small grain,

and the number of hedgerows between fields.

Good management can improve the habitat for openland wildlife. Good management practices include protecting the existing sand prairie and hill prairie vegetation, leaving crop fields unplowed through the winter, and establishing and maintaining hedgerows. Deferring mowing of grassed waterways, roadsides, and irrigation corners until early August, after the nesting season, can significantly increase populations of wildlife species that nest on the ground.

Most of the soil associations in Mason County include areas of woodland wildlife habitat. The quality of the habitat is good in many of these areas, which are used primarily for production of timber and Christmas trees. Major wildlife species in these areas are white-tailed deer, squirrels, raccoons, owls, woodpeckers, and a variety of other nongame birds.

Management practices that improve the habitat for woodland wildlife include excluding livestock from woodland areas, improving timber stands and encouraging the production of mast-producing trees, and retaining valuable den trees and snags.

Areas of wetland wildlife habitat in Mason County are on poorly drained soils, such as the soils in associations 4, 5, and 10. Most of the good wetland areas are in association 10, along the Illinois and Sangamon Rivers and Salt Creek. Wetland areas that are not heavily flooded are used primarily for crops. Other wetland areas are used for recreational purposes. The potential for wetland wildlife habitat in some areas along the rivers and creeks is only fair because of siltation.

Using management practices that promote the growth of plants that can tolerate wetness, installing artificial nesting structures and establishing feeding areas for waterfowl, and maintaining native grasses adjacent to the wetland improve wetland habitat. Erosion-control measures are needed in upland areas to prevent sediment from filling in the wetlands and destroying the plant communities.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of grain and seed crops are corn, wheat, oats, barley, rye, and sunflowers.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture also are considerations. Examples of grasses and legumes are fescue, orchardgrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, foxtail, and ragweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of

these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, cattail, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, opossum, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, beaver, frogs, turtles, and snakes.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a

special meaning in soil science and are defined in the "Glossary."

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, and flooding affect

absorption of the effluent. Large stones interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel are less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The

performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil

and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 18.

Rock fragments 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-

weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent;

moderate, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in

table 17, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. Table 17 shows the expected total subsidence, which results from a combination of factors.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low, moderate,* or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 18 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Illinois Department of Transportation.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 422 (ASTM), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 4318 (ASTM); Plasticity index—T 90 (AASHTO), D 4318 (ASTM); and Moisture density—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(10)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udoll (*Ud*, meaning humid, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Argiudolls (*Argi*, meaning an argillic horizon, plus *udolls*, the suborder of the Mollisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Argiudolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-loamy, mixed, mesic Typic Argiudolls.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the underlying material can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(11)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(10)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Ade Series

The Ade series consists of somewhat excessively drained, rapidly permeable soils on stream terraces,

uplands, and dunes. These soils formed in wind- and water-deposited, sandy and loamy material. Slope ranges from 1 to 7 percent.

Typical pedon of Ade loamy fine sand, 1 to 7 percent slopes, 353 feet south and 234 feet west of the northeast corner of sec. 10, T. 20 N., R. 6 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) loamy fine sand, dark grayish brown (10YR 4/2) dry; weak fine granular structure; very friable; few very fine roots; slightly acid; clear smooth boundary.

A—8 to 16 inches; very dark grayish brown (10YR 3/2) loamy fine sand, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure; very friable; few very fine roots; slightly acid; clear smooth boundary.

AB—16 to 22 inches; dark brown (10YR 3/3) loamy fine sand, brown (10YR 5/3) dry; weak medium subangular blocky structure; very friable; few very fine roots; moderately acid; clear smooth boundary.

Bw—22 to 31 inches; brown (10YR 4/3) loamy fine sand; weak medium subangular blocky structure; very friable; few very fine roots; moderately acid; abrupt smooth boundary.

E and Bt—31 to 46 inches; dark yellowish brown (10YR 4/4) fine sand (E); single grain; loose; dark brown (7.5YR 3/4) fine sandy loam (Bt); weak medium subangular blocky structure; very friable; few very fine roots; lamellae 0.5 to 1.0 inch thick, total thickness of 3 inches; slightly acid; clear smooth boundary.

Bt and E—46 to 60 inches; dark brown (7.5YR 3/4) fine sandy loam (Bt); weak medium subangular blocky structure; very friable; lamellae 1 to 4 inches thick, total thickness of 9 inches; dark yellowish brown (10YR 4/4) fine sand (E); single grain; loose; moderately acid.

Depth to the lamellae ranges from 30 to 45 inches.

The Ap and A horizons have chroma of 1 or 2. They are loamy sand, sand, loamy fine sand, or fine sand. The Bw horizon has value of 4 or 5 and chroma of 3 or 4. It is loamy fine sand, loamy sand, fine sand, or sand. The E part of the E and Bt horizon has value of 4 or 5 and chroma of 3 to 6. It is sand or fine sand. The Bt part of the E and Bt horizon has value of 3 or 4. It is loamy sand, sandy loam, fine sandy loam, or loamy fine sand.

Alvin Series

The Alvin series consists of well drained soils on uplands and stream terraces. These soils formed in outwash or eolian deposits. Permeability is moderate in the upper part of the profile and moderately rapid in the lower part. Slope ranges from 0 to 30 percent.

Typical pedon of Alvin fine sandy loam, 0 to 2 percent slopes, 799 feet south and 111 feet east of the center of sec. 26, T. 20 N., R. 8 W.

Ap—0 to 5 inches; brown (10YR 4/3) fine sandy loam, light yellowish brown (10YR 6/4) dry; weak fine granular structure; friable; common very fine roots; very strongly acid; clear smooth boundary.

E—5 to 18 inches; yellowish brown (10YR 5/4) fine sandy loam, light yellowish brown (10YR 6/4) dry; weak medium platy structure; friable; few very fine roots; very strongly acid; clear smooth boundary.

Bt1—18 to 30 inches; yellowish brown (10YR 5/6) fine sandy loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—30 to 35 inches; yellowish brown (10YR 5/4) fine sandy loam; moderate medium subangular blocky structure; friable; few very fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt3—35 to 45 inches; yellowish brown (10YR 5/4) loam; moderate medium subangular blocky structure; friable; few very fine roots; common distinct dark brown (7.5YR 4/4) clay films on faces of peds; very strongly acid; gradual smooth boundary.

E and Bt—45 to 60 inches; strong brown (7.5YR 5/6) loamy fine sand (E); single grain; loose; dark brown (7.5YR 4/4) fine sandy loam (Bt); weak fine subangular blocky structure; friable; very strongly acid.

Thickness of the solum ranges from 50 to more than 60 inches.

The Ap or A horizon has value of 3 or 4 and chroma of 2 or 3. It is fine sandy loam, sandy loam, loamy fine sand, or loamy sand. The E horizon has value of 4 or 5 and chroma of 3 or 4. It is loamy fine sand, loamy sand, fine sandy loam, or sandy loam. Pedons in eroded areas do not have an E horizon. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. It is fine sandy loam, sandy loam, or loam. The E part of the E and Bt horizon has hue of 7.5YR or 10YR and chroma of 4 to 6. It is loamy fine sand, loamy sand, fine sand, or sand. The Bt part has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is fine sandy loam, sandy loam, or loamy fine sand.

Ambraw Series

The Ambraw series consists of poorly drained, moderately permeable soils on flood plains. These soils

formed in alluvium. Slope ranges from 0 to 2 percent.

Typical pedon of Ambraw clay loam, occasionally flooded, 1,508 feet north and 706 feet east of the southwest corner of sec. 36, T. 20 N., R. 7 W.

Ap—0 to 9 inches; very dark gray (10YR 3/1) clay loam, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure parting to weak medium granular; firm; few very fine roots; few fine concretions and accumulations of iron and manganese oxide; slightly acid; clear smooth boundary.

A—9 to 15 inches; very dark grayish brown (10YR 3/2) clay loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to weak medium granular; friable; few very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; few fine concretions and accumulations of iron and manganese oxide; slightly acid; clear smooth boundary.

Bg—15 to 19 inches; dark grayish brown (2.5Y 4/2) clay loam; common fine prominent dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; few very fine roots; many distinct very dark grayish brown (2.5Y 3/2) organic coatings on faces of peds; few medium concretions and accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Btg1—19 to 29 inches; grayish brown (2.5Y 5/2) clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; common medium concretions and accumulations of iron and manganese oxide; neutral; gradual smooth boundary.

Btg2—29 to 38 inches; grayish brown (2.5Y 5/2) clay loam; many coarse prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; common medium concretions and accumulations of iron and manganese oxide; neutral; abrupt smooth boundary.

BCg—38 to 49 inches; stratified dark gray (5Y 4/1) loam and grayish brown (2.5Y 5/2) sandy loam; many medium and coarse prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; common fine concretions and accumulations of iron and manganese oxide; neutral; abrupt smooth boundary.

Cg—49 to 60 inches; mottled grayish brown (2.5Y 5/2), light brownish gray (2.5Y 6/2), and strong brown (7.5YR 5/6), stratified loam, loamy sand, and sand; massive; very friable; neutral.

Thickness of the solum ranges from 41 to 60 inches. The mollic epipedon is 10 to 24 inches thick. The content of organic carbon decreases irregularly with increasing depth. It is more than 0.3 percent in some subhorizons above a depth of 50 inches.

The Ap and A horizons have value of 2 or 3. They are clay loam, loam, or silty clay loam. The Bg or Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. It is clay loam or loam.

Arenzville Series

The Arenzville series consists of moderately well drained, moderately permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Typical pedon of Arenzville silt loam, occasionally flooded, 2,283 feet north and 951 feet west of the southeast corner of sec. 34, T. 20 N., R. 6 W.

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam, yellowish brown (10YR 5/4) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; neutral; clear smooth boundary.

C1—9 to 17 inches; dark brown (10YR 4/3 and 3/3) and brown (10YR 5/3) silt loam; massive; friable; few very fine roots; neutral; gradual wavy boundary.

C2—17 to 24 inches; dark brown (10YR 4/3), brown (10YR 5/3), and dark grayish brown (10YR 4/2) silt loam; massive; friable; few very fine roots; common fine strong brown (7.5YR 5/6) accumulations of iron and manganese oxide; few very thin lenses of fine sand; neutral; clear wavy boundary.

C3—24 to 30 inches; dark grayish brown (10YR 4/2) and dark brown (10YR 4/3) silt loam; massive; friable; slightly alkaline; clear wavy boundary.

Ab1—30 to 36 inches; very dark gray (10YR 3/1) silt loam; common fine distinct dark brown (10YR 4/3) mottles; weak medium subangular blocky structure parting to weak medium granular; friable; slightly alkaline; clear smooth boundary.

Ab2—36 to 48 inches; black (10YR 2/1) silty clay loam; few fine distinct dark brown (10YR 4/3) mottles; moderate medium subangular blocky structure; friable; slightly alkaline; clear smooth boundary.

Ab3—48 to 60 inches; very dark gray (10YR 3/1) silty clay loam; few fine distinct dark brown (10YR 4/3) mottles; weak medium prismatic structure parting to

moderate medium subangular blocky; friable; slightly alkaline.

Depth to the Ab horizon ranges from 20 to 40 inches. The content of organic carbon decreases irregularly with increasing depth. It is more than 0.2 percent to a depth of 50 inches.

The Ap or A horizon has chroma of 2 or 3. The C horizon has value of 3 to 5 and chroma of 2 to 4.

Beaucoup Series

The Beaucoup series consists of poorly drained, moderately slowly permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Typical pedon of Beaucoup silty clay loam, occasionally flooded, 212 feet south and 1,575 feet west of the northeast corner of sec. 6, T. 19 N., R. 6 W.

Ap—0 to 10 inches; very dark gray (10YR 3/1) silty clay loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; few very fine roots; common faint black (10YR 2/1) organic coatings on faces of peds; moderately acid; clear smooth boundary.

A—10 to 17 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; common fine distinct dark yellowish brown (10YR 4/4) mottles; weak fine subangular blocky structure; friable; few very fine roots; few medium dark concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Bg1—17 to 22 inches; dark gray (10YR 4/1) silty clay loam; common fine distinct dark yellowish brown (10YR 4/4) mottles; weak medium prismatic structure parting to weak fine and medium subangular blocky; friable; few very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few medium dark concretions of iron and manganese oxide; moderately acid; clear smooth boundary.

Bg2—22 to 36 inches; olive gray (5Y 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few very fine roots; many distinct dark gray (10YR 4/1) coatings and common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common medium dark concretions of iron and manganese oxide; very dark gray (10YR 3/1) krotovinas; moderately acid; clear smooth boundary.

BCg—36 to 45 inches; mottled light olive gray (5Y 6/2) and yellowish brown (10YR 5/6) silty clay loam; weak coarse prismatic structure; friable; few very fine roots; moderately acid; gradual smooth boundary.

Cg—45 to 60 inches; light olive gray (5Y 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; neutral.

Thickness of the solum ranges from 35 to 60 inches. Thickness of the mollic epipedon ranges from 14 to 24 inches. The content of organic carbon decreases irregularly with increasing depth. It is more than 0.3 percent in some subhorizons above a depth of 50 inches.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y and value of 4 to 6. The Cg horizon is silty clay loam, silt loam, or loam.

Bloomfield Series

The Bloomfield series consists of somewhat excessively drained, rapidly permeable soils on dunes, stream terraces, and uplands. These soils formed in wind- and water-deposited, sandy material. Slope ranges from 1 to 15 percent.

Typical pedon of Bloomfield sand, 1 to 7 percent slopes, 2,490 feet north and 1,800 feet west of the southeast corner of sec. 12, T. 22 N., R. 8 W.

Ap—0 to 8 inches; mixed dark yellowish brown (10YR 3/4) and dark brown (10YR 3/3) sand, brown (10YR 5/3) dry; weak fine granular structure; very friable; common very fine roots; neutral; abrupt smooth boundary.

E1—8 to 24 inches; dark brown (10YR 4/3) sand; single grain; loose; few very fine roots; slightly acid; gradual smooth boundary.

E2—24 to 45 inches; dark yellowish brown (10YR 4/4) sand; single grain; loose; few very fine roots; slightly acid; abrupt smooth boundary.

Bt and E—45 to 60 inches; dark brown (7.5YR 4/4) loamy sand (Bt); weak fine and medium subangular blocky structure; very friable; nearly continuous lamellae, total thickness of 13 inches; dark yellowish brown (10YR 4/6) sand (E); single grain; loose; strongly acid.

Depth to the lamellae ranges from 34 to 52 inches.

The Ap or A horizon has value of 3 or 4 and chroma of 2 to 4. It is sand, fine sand, loamy sand, or loamy fine sand. The E horizon has value of 4 or 5 and chroma of 3 to 6. The E part of the Bt and E horizon has value of 4 or 5 and chroma of 4 to 6. The Bt part has hue of 7.5YR or 10YR and chroma of 4 to 6. It is loamy sand, loamy fine sand, fine sand, or sand.

Bold Series

The Bold series consists of well drained, moderately permeable soils on uplands. These soils formed in calcareous loess. Slope ranges from 7 to 15 percent.

Typical pedon of Bold silt loam, in an area of Tallula-Bold complex, 7 to 15 percent slopes, eroded, 2,116 feet north and 801 feet west of the southeast corner of sec. 24, T. 20 N., R. 7 W.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, dark brown (10YR 4/3) dry; weak fine subangular blocky structure; very friable; few fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings in root channels; slight effervescence; moderately alkaline; clear smooth boundary.

C1—7 to 13 inches; brown (10YR 4/3) silt; massive; very friable; few fine roots; few faint dark brown (10YR 3/3) organic coatings on cleavage planes; few fine concretions of calcium carbonate; strong effervescence; moderately alkaline; gradual smooth boundary.

C2—13 to 22 inches; brown (10YR 4/3) silt; massive; very friable; few fine roots; few fine concretions of calcium carbonate; strong effervescence; moderately alkaline; gradual smooth boundary.

C3—22 to 60 inches; yellowish brown (10YR 5/4) silt; massive; very friable; few fine roots; common fine and medium concretions of calcium carbonate; strong effervescence; moderately alkaline.

Thickness of the solum ranges from 4 to 10 inches. The depth to free carbonates is 10 inches or less.

The Ap or A horizon has chroma of 2 or 3. The C horizon has value of 4 to 6 and chroma of 2 to 6.

Broadwell Series

The Broadwell series consists of well drained soils on uplands. These soils formed in loess and in the underlying sandy eolian deposits. Permeability is moderate in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 10 percent.

Typical pedon of Broadwell silt loam, 2 to 5 percent slopes, 1,797 feet north and 389 feet west of the southeast corner of sec. 10, T. 21 N., R. 5 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak fine subangular blocky structure parting to weak fine granular; friable; common very fine roots; moderately acid; clear smooth boundary.

A—9 to 14 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak very fine and fine subangular blocky structure; friable; few very fine roots; many faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; clear smooth boundary.

BA—14 to 19 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 5/3) dry; weak fine subangular blocky structure; friable; few very fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; clear smooth boundary.

Bt1—19 to 23 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine and fine subangular blocky structure; friable; few very fine roots; many distinct dark brown (10YR 4/3) clay films and few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; clear smooth boundary.

Bt2—23 to 31 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; few very fine roots; many distinct dark brown (10YR 4/3) clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt3—31 to 42 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; many distinct dark brown (10YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.

2Bt4—42 to 45 inches; yellowish brown (10YR 5/4) loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; few very fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; moderately acid; clear smooth boundary.

2BC—45 to 60 inches; yellowish brown (10YR 5/6) loamy fine sand; weak medium subangular blocky structure; very friable; few very fine roots; moderately acid.

Thickness of the solum ranges from 45 to more than 60 inches. Thickness of the loess ranges from 40 to 60 inches. The mollic epipedon is 10 to 23 inches thick.

The Ap and A horizons have chroma of 1 to 3. The Bt and 2Bt horizons have chroma of 3 to 6. The 2BC horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is loamy fine sand or fine sand.

Broadwell silt loam, 5 to 10 percent slopes, eroded, has a thinner dark surface layer than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soil.

Calco Series

The Calco series consists of poorly drained, moderately permeable soils on flood plains. These soils

formed in calcareous alluvium. Slope ranges from 0 to 2 percent.

Typical pedon of Calco silt loam, occasionally flooded, 2,253 feet south and 2,058 feet east of the northwest corner of sec. 29, T. 20 N., R. 5 W.

Ap—*0 to 9 inches;* black (10YR 2/1) silt loam, gray (10YR 5/1) dry; moderate fine subangular blocky structure parting to moderate medium granular; friable; few fine roots; violent effervescence; moderately alkaline; abrupt smooth boundary.

A1—*9 to 14 inches;* black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; few medium prominent strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure parting to moderate medium granular; friable; few fine roots; few fine concretions of calcium carbonate; violent effervescence; moderately alkaline; abrupt smooth boundary.

A2—*14 to 19 inches;* very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; common medium prominent dark brown (7.5YR 4/4) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; many faint black (10YR 2/1) organic coatings on faces of peds; few fine concretions of calcium carbonate; strong effervescence; moderately alkaline; clear smooth boundary.

A3—*19 to 22 inches;* very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; common medium prominent dark brown (7.5YR 4/4) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; common faint black (10YR 2/1) organic coatings on faces of peds; few medium accumulations of calcium carbonate; slight effervescence; moderately alkaline; clear smooth boundary.

A4—*22 to 31 inches;* very dark gray (5Y 3/1) silty clay loam, gray (10YR 5/1) dry; many coarse faint dark gray (5Y 4/1) and few medium prominent dark brown (7.5YR 4/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; very slight effervescence; moderately alkaline; abrupt smooth boundary.

Bg—*31 to 37 inches;* light gray (5Y 6/1) silty clay loam; few fine prominent dark brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; slight effervescence; moderately alkaline; gradual smooth boundary.

Cg—*37 to 60 inches;* light gray (5Y 6/1) silt loam; few medium prominent dark brown (7.5YR 4/4) mottles; massive; friable; few fine roots; slight effervescence; moderately alkaline.

Thickness of the solum ranges from 35 to 50 inches. Thickness of the mollic epipedon ranges from 30 to 40 inches.

The Bg horizon has hue of 10YR, 2.5Y, or 5Y and value of 4 to 6. The Cg horizon has hue of 2.5Y or 5Y, value of 5 or 6, and chroma of 1 or 2. It is silt loam or silty clay loam.

Canisteo Series

The Canisteo series consists of poorly drained soils on stream terraces. These soils formed in calcareous outwash. Permeability is moderate in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 2 percent.

Typical pedon of Canisteo loam, sandy substratum, 180 feet south and 173 feet west of the northeast corner of sec. 13, T. 21 N., R. 7 W.

Ap—*0 to 10 inches;* black (10YR 2/1) loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure parting to weak medium granular; friable; few very fine roots; strong effervescence; moderately alkaline; abrupt smooth boundary.

A—*10 to 14 inches;* very dark gray (10YR 3/1) loam, gray (10YR 5/1) dry; weak medium subangular blocky structure; friable; few very fine roots; strong effervescence; moderately alkaline; gradual smooth boundary.

BAg—*14 to 21 inches;* dark gray (10YR 4/1) loam; few fine prominent light olive brown (2.5Y 5/4) mottles; weak medium subangular blocky structure; friable; few very fine roots; strong effervescence; moderately alkaline; clear smooth boundary.

Bg1—*21 to 28 inches;* gray (10YR 5/1) clay loam; many fine prominent yellowish brown (10YR 5/6) and few medium prominent brownish yellow (10YR 6/8) mottles; weak fine prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; slight effervescence; moderately alkaline; clear smooth boundary.

Bg2—*28 to 36 inches;* grayish brown (2.5Y 5/2) clay loam; many fine prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/6) mottles; moderate fine prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common medium accumulations of iron and manganese oxide; slight effervescence; moderately alkaline; clear smooth boundary.

Bg3—*36 to 45 inches;* light gray (5Y 6/1) loam; many medium prominent yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; dark gray (10YR 4/1) krotovinas;

slight effervescence; moderately alkaline; clear smooth boundary.

BCg—45 to 48 inches; dark grayish brown (2.5Y 4/2) sandy loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; slight effervescence; moderately alkaline; clear smooth boundary.

2C—48 to 60 inches; brown (10YR 5/3) sand; common fine distinct yellowish brown (10YR 5/6) mottles; single grain; loose; slight effervescence; moderately alkaline.

Thickness of the solum and of the loamy outwash ranges from 40 to 50 inches. Thickness of the mollic epipedon ranges from 14 to 24 inches.

The Ap and A horizons have chroma of 1 or 2. The Bg horizon has value of 4 to 6. It is loam, clay loam, silty clay loam, or sandy loam. The 2C horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 2 to 4. It is sand or loamy sand.

Cohoctah Series

The Cohoctah series consists of poorly drained, moderately rapidly permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Typical pedon of Cohoctah loam, wet, 2,010 feet south and 1,260 feet east of the northwest corner of sec. 8, T. 19 N., R. 10 W.

A1—0 to 8 inches; very dark gray (10YR 3/1) loam, gray (10YR 5/1) dry; common fine and medium prominent dark brown (7.5YR 4/4) mottles; moderate fine granular structure; friable; many very fine and fine roots; moderately acid; clear smooth boundary.

A2—8 to 14 inches; very dark gray (10YR 3/1) sandy loam, gray (10YR 5/1) dry; common medium prominent dark brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; friable; common very fine and fine roots; few faint black (10YR 2/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

BAg—14 to 18 inches; dark gray (10YR 4/1) fine sandy loam; many medium faint very dark gray (10YR 3/1) and few medium prominent dark brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; friable; common very fine and fine roots; neutral; clear smooth boundary.

Bg1—18 to 27 inches; light brownish gray (2.5Y 6/2) fine sandy loam; many medium faint grayish brown (2.5Y 5/2) and few medium prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; neutral; clear smooth boundary.

Bg2—27 to 36 inches; grayish brown (2.5Y 5/2) sandy loam; many coarse prominent strong brown (7.5YR 5/6) and faint dark grayish brown (2.5Y 4/2) mottles; weak medium subangular blocky structure; friable; few very fine roots; common distinct very dark grayish brown (2.5Y 3/2) organic coatings in root channels; neutral; gradual smooth boundary.

Cg—36 to 60 inches; grayish brown (2.5Y 5/2) fine sandy loam; many coarse prominent strong brown (7.5YR 5/6) and faint dark gray (5Y 4/1) mottles; massive; friable; few very fine roots; neutral.

Thickness of the solum ranges from 20 to 36 inches. The mollic epipedon is 10 to 18 inches thick. The content of organic carbon decreases irregularly with increasing depth. It is more than 0.3 percent in some subhorizons above a depth of 50 inches.

The A horizon has value of 2 or 3. It is loam, sandy loam, or fine sandy loam. The Bg horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 3 to 6 and chroma of 0 to 2. The Cg horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 4. It is fine sandy loam, sandy loam, loamy fine sand, loamy sand, fine sand, or sand.

Dakota Series

The Dakota series consists of well drained soils on stream terraces and uplands. These soils formed in outwash or eolian deposits. Permeability is moderate in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 5 percent.

Typical pedon of Dakota fine sandy loam, 0 to 2 percent slopes, 188 feet south and 450 feet west of the center of sec. 11, T. 22 N., R. 6 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam, grayish brown (10YR 5/2) dry; weak very fine granular structure; friable; common very fine roots; slightly acid; abrupt smooth boundary.

AB—9 to 18 inches; dark brown (10YR 3/3) loam, brown (10YR 5/3) dry; moderate fine granular structure; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; gradual smooth boundary.

Bt1—18 to 25 inches; brown (10YR 4/3) loam; moderate fine subangular blocky structure; friable; very fine roots; common distinct dark brown (10YR 3/3) clay films and very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; gradual smooth boundary.

Bt2—25 to 32 inches; dark yellowish brown (10YR 4/4) clay loam; weak fine prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt3—32 to 36 inches; yellowish brown (10YR 5/4) sandy loam; weak fine and medium subangular blocky structure; friable; few distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.

2C—36 to 60 inches; yellowish brown (10YR 5/6) fine sand that has a few thin bands of loamy sand; single grain; loose; slightly acid.

Thickness of the solum ranges from 25 to 42 inches. Thickness of the loamy outwash or eolian deposits ranges from 25 to 40 inches. Thickness of the mollic epipedon ranges from 10 to 18 inches. The content of gravel in the C horizon ranges from 0 to 35 percent.

The Ap and A horizons have value and chroma of 2 or 3. The Bt horizon is loam, sandy clay loam, or clay loam. The 2Bt or 2BC horizon is sandy loam or loamy sand. The 2C horizon has value of 4 or 5 and chroma of 4 to 6. It is sand, fine sand, coarse sand, loamy sand, loamy fine sand, or loamy coarse sand.

Disco Series

The Disco series consists of well drained soils on stream terraces. These soils formed in outwash. Permeability is moderately rapid. Slope ranges from 0 to 2 percent.

Typical pedon of Disco sandy loam, 816 feet north and 1,203 feet west of the southeast corner of sec. 13, T. 22 N., R. 8 W.

Ap—0 to 11 inches; very dark grayish brown (10YR 3/2) sandy loam, brown (10YR 5/3) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; strongly acid; clear smooth boundary.

A—11 to 26 inches; very dark grayish brown (10YR 3/2) sandy loam, brown (10YR 5/3) dry; weak medium subangular blocky structure; friable; few very fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; strongly acid; gradual smooth boundary.

Bw1—26 to 34 inches; dark brown (10YR 3/3) sandy loam, brown (10YR 5/3) dry; weak medium subangular blocky structure; friable; few very fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; gradual smooth boundary.

Bw2—34 to 41 inches; brown (10YR 4/3) sandy loam; weak medium subangular blocky structure; friable; few very fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; clear smooth boundary.

BC—41 to 46 inches; brown (10YR 4/3) loamy sand and dark yellowish brown (10YR 4/4) sand; weak medium subangular blocky structure; very friable; few very fine roots; moderately acid; clear smooth boundary.

C—46 to 60 inches; dark yellowish brown (10YR 4/4) sand; single grain; loose; moderately acid.

Thickness of the solum ranges from 36 to 56 inches. Thickness of the mollic epipedon ranges from 24 to 36 inches.

The Ap and A horizons have chroma of 1 to 3. The Bw horizon has chroma of 3 or 4. It is sandy loam or loamy sand. The C horizon has value of 4 or 5 and chroma of 4 to 6. It is sand or loamy sand.

Dockery Series

The Dockery series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Typical pedon of Dockery silty clay loam, frequently flooded, 480 feet north and 750 feet west of the center of sec. 4, T. 19 N., R. 11 W.

A—0 to 9 inches; mixed very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) silty clay loam, grayish brown (10YR 5/2) and brown (10YR 5/3) dry; moderate very fine and fine granular structure; thin bedding planes in the upper 2 inches; friable; many very fine and fine roots and few medium roots; common fine strong brown (7.5YR 4/6) accumulations of iron and manganese oxide; neutral; gradual smooth boundary.

C—9 to 21 inches; dark grayish brown (10YR 4/2), grayish brown (10YR 5/2), and very dark grayish brown (10YR 3/2) silt loam; massive; friable; common very fine roots and few fine and coarse roots; common fine and medium strong brown (7.5YR 4/6) accumulations of iron and manganese oxide; neutral; gradual smooth boundary.

Cg—21 to 60 inches; dark grayish brown (2.5Y 4/2), grayish brown (2.5Y 5/2), and very dark grayish brown (10YR 3/2) silt loam and silty clay loam; massive; friable; common very fine, fine, and medium roots; many fine and medium strong brown (7.5YR 4/6) accumulations of iron and manganese oxide; neutral.

Thickness of the solum ranges from 6 to 10 inches. The content of organic carbon decreases irregularly with increasing depth. It is more than 0.2 percent to a depth of 50 inches.

The A or Ap horizon is silty clay loam or silt loam. The C horizon has chroma of 1 to 3. It is silt loam, silty clay loam, or loam.

Drummer Series

The Drummer series consists of poorly drained, moderately permeable soils on stream terraces. These soils formed in loess or silty material and in the underlying stratified outwash. Slope ranges from 0 to 2 percent.

Typical pedon of Drummer silty clay loam, 1,104 feet north and 165 feet east of the southwest corner of sec. 5, T. 21 N., R. 5 W.

Ap—0 to 9 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine and fine roots; neutral; abrupt smooth boundary.

A—9 to 19 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; few fine prominent dark yellowish brown (10YR 3/6) mottles; weak medium subangular blocky structure; friable; few very fine and fine roots; neutral; clear smooth boundary.

Bg1—19 to 24 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common medium prominent dark yellowish brown (10YR 4/6) mottles; moderate fine subangular blocky structure; friable; few very fine roots; many distinct black (N 2/0) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg2—24 to 31 inches; dark grayish brown (2.5Y 4/2) silty clay loam; many medium prominent yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct dark gray (10YR 4/1) coatings on faces of peds; neutral; clear smooth boundary.

Bg3—31 to 41 inches; light olive gray (5Y 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; friable; few very fine roots; common distinct dark gray (10YR 4/1) coatings on faces of peds; black (N 2/0) krotovinas; neutral; clear smooth boundary.

2BCg—41 to 53 inches; light olive gray (5Y 6/2) silt loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; friable; neutral; abrupt smooth boundary.

2Cg—53 to 60 inches; mottled light olive gray (5Y 6/2), olive (5Y 5/3), and yellowish brown (10YR 5/6), stratified sandy loam, loamy sand, and silt loam; massive; friable; neutral.

Thickness of the solum ranges from 42 to more than 60 inches. Thickness of the loess or silty material ranges from 40 to 60 inches. The mollic epipedon is 12 to 24 inches thick.

The Ap and A horizons have hue of 10YR or 2.5Y or are neutral in hue. They have value of 2 or 3 and chroma of 0 to 2. They are silty clay loam or silt loam. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 to 6, and chroma of 1 or 2. The 2BCg horizon has hue of 2.5Y or 5Y, value of 5 or 6, and chroma of 1 or 2. It is silt loam, loam, or sandy loam. The 2Cg horizon is stratified silt loam, loam, sandy loam, or loamy sand.

Edgington Series

The Edgington series consists of poorly drained, slowly permeable soils on uplands and stream terraces. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Edgington silt loam, 140 feet north and 540 feet west of the center of sec. 15, T. 21 N., R. 5 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure parting to weak fine granular; friable; many very fine roots; neutral; abrupt smooth boundary.

A—9 to 17 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; common very fine roots; slightly acid; abrupt smooth boundary.

Eg1—17 to 22 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium platy structure; friable; common very fine roots; common distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; moderately acid; clear smooth boundary.

Eg2—22 to 25 inches; grayish brown (2.5Y 5/2) silt loam, light gray (2.5Y 7/2) dry; few fine prominent dark yellowish brown (10YR 4/4) mottles; weak medium platy structure; friable; few very fine roots; many distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; moderately acid; abrupt smooth boundary.

Btg1—25 to 28 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few very fine

roots; common distinct black (10YR 2/1) clay films and few distinct light gray (10YR 7/1 dry) silt coatings on faces of peds; moderately acid; abrupt smooth boundary.

Btg2—28 to 40 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; many distinct black (10YR 2/1) and common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; common distinct black (10YR 2/1) clay films in root channels; moderately acid; clear smooth boundary.

Btg3—40 to 51 inches; light brownish gray (2.5Y 6/2) silty clay loam; many coarse prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; few distinct very dark grayish brown (2.5Y 3/2) clay films on faces of peds; common distinct black (10YR 2/1) clay films in root channels; moderately acid; gradual smooth boundary.

Btg4—51 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; many coarse prominent yellowish brown (10YR 5/6) mottles; weak medium and coarse subangular blocky structure; friable; few very fine roots; very few distinct very dark grayish brown (2.5Y 3/2) clay films on faces of peds; slightly acid.

Thickness of the solum ranges from 50 to more than 60 inches. Thickness of the mollic epipedon ranges from 12 to 17 inches.

The Ap and A horizons have value of 2 or 3. The Eg horizon has value of 4 to 6 and chroma of 1 or 2. The Btg horizon has hue of 10YR, 2.5Y, or 5Y and chroma of 1 or 2.

Elburn Series

The Elburn series consists of somewhat poorly drained, moderately permeable soils on stream terraces. These soils formed in loess or silty material and in the underlying stratified outwash. Slope ranges from 0 to 2 percent.

Typical pedon of Elburn silt loam, 2,520 feet south and 1,275 feet west of the northeast corner of sec. 12, T. 21 N., R. 6 W.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; common very fine roots; neutral; abrupt smooth boundary.

A—8 to 19 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure; friable; few very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

BA—19 to 23 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate very fine and fine subangular blocky structure; friable; few very fine roots; many faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—23 to 30 inches; brown (10YR 5/3) silty clay loam; many medium distinct light brownish gray (10YR 6/2) and common fine distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate very fine and fine subangular blocky; friable; few very fine roots; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—30 to 37 inches; light brownish gray (10YR 6/2) silty clay loam; many medium distinct brown (10YR 5/3) and common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; many distinct dark grayish brown (10YR 4/2) and brown (10YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.

Bt3—37 to 46 inches; light brownish gray (10YR 6/2) silty clay loam; many coarse prominent light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few very fine roots; many distinct very dark gray (10YR 3/1) and dark grayish brown (10YR 4/2) clay films on faces of peds; moderately acid; clear smooth boundary.

2BC—46 to 55 inches; mottled light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6), stratified silt loam, fine sandy loam, and loamy fine sand; weak medium and coarse subangular blocky structure; friable; slightly acid; clear smooth boundary.

2C—55 to 60 inches; mottled light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6), stratified silt loam, loamy fine sand, and fine sandy loam; massive; friable; neutral.

Thickness of the solum ranges from 45 to more than 60 inches. Thickness of the loess or silty material ranges from 40 to 60 inches. The mollic epipedon ranges from 10 to 19 inches in thickness.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 to 6 and chroma of 2 to 4. The 2Bt or 2BC horizon has chroma of 2 to 6. It is sandy loam, loam, or silt loam

and commonly has strata of loamy sand or loamy fine sand.

Fayette Series

The Fayette series consists of well drained, moderately permeable soils on uplands and stream terraces. These soils formed in loess. Slope ranges from 1 to 30 percent.

Typical pedon of Fayette silt loam, 18 to 30 percent slopes, 1,200 feet south and 1,320 feet west of the northeast corner of sec. 34, T. 20 N., R. 6 W.

A—0 to 5 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

E—5 to 10 inches; dark brown (10YR 4/3) silt loam, light brownish gray (10YR 6/2) dry; weak medium platy structure; friable; common fine roots; many faint very dark grayish brown (10YR 3/2) organic coatings and few distinct very pale brown (10YR 7/3 dry) silt coatings on faces of peds; neutral; clear smooth boundary.

BE—10 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings and very pale brown (10YR 7/3 dry) silt coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—14 to 22 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; many distinct dark brown (10YR 4/3) clay films and common distinct very pale brown (10YR 8/3 dry) silt coatings on faces of peds; moderately acid; clear smooth boundary.

Bt2—22 to 36 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; many distinct dark brown (10YR 4/3) clay films and few distinct very pale brown (10YR 8/3 dry) silt coatings on faces of peds; very strongly acid; gradual smooth boundary.

Bt3—36 to 46 inches; yellowish brown (10YR 5/4) silt loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; moderately acid; gradual smooth boundary.

C—46 to 60 inches; yellowish brown (10YR 5/4) silt loam; massive; friable; moderately acid.

Thickness of the solum ranges from 45 to more than 60 inches.

The Ap or A horizon has value of 3 or 4 and chroma of 2 or 3. In uneroded or moderately eroded areas, it is silt loam. In severely eroded areas it is silty clay loam. The E horizon has value of 4 or 5 and chroma of 2 to 4. Pedons in eroded areas do not have an E horizon. The Bt horizon has chroma of 3 or 4.

Gilford Series

The Gilford series consists of poorly drained soils on stream terraces. These soils formed in outwash. Permeability is moderately rapid. Slope ranges from 0 to 2 percent.

Typical pedon of Gilford sandy loam, 1,094 feet south and 2,250 feet east of the northwest corner of sec. 27, T. 22 N., R. 6 W.

Ap—0 to 9 inches; black (10YR 2/1) sandy loam, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure parting to weak fine granular; friable; common very fine roots; slightly acid; clear smooth boundary.

A—9 to 15 inches; very dark gray (10YR 3/1) sandy loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; common faint black (10YR 2/1) organic coatings on faces of peds; few medium dark concretions of iron and manganese oxide; neutral; gradual smooth boundary.

Bg—15 to 27 inches; dark grayish brown (2.5Y 4/2) sandy loam; many coarse faint grayish brown (2.5Y 5/2), common fine distinct light olive brown (2.5Y 5/4), and few fine prominent strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

2BCg—27 to 36 inches; dark grayish brown (2.5Y 4/2) loamy sand; many medium faint grayish brown (2.5Y 5/2), few fine prominent strong brown (7.5YR 5/6), and few fine distinct light olive brown (2.5Y 5/4) mottles; weak fine and medium subangular blocky structure; very friable; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

2Cg1—36 to 48 inches; light brownish gray (2.5Y 6/2) sand; many medium faint grayish brown (2.5Y 5/2), common medium prominent yellowish brown (10YR 5/6), and few fine distinct light olive brown (2.5Y 5/4) mottles; single grain; loose; few very fine roots; neutral; clear smooth boundary.

2Cg2—48 to 60 inches; mottled yellowish brown (10YR

5/6) and light brownish gray (2.5Y 6/2) sand; single grain; loose; neutral.

Thickness of the solum ranges from 30 to 40 inches. Thickness of the mollic epipedon ranges from 10 to 24 inches.

The Ap and A horizons have hue of 10YR or 2.5Y or are neutral in hue. They have chroma of 0 to 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. The Cg horizon is sand or loamy sand.

Hamburg Series

The Hamburg series consists of deep, somewhat excessively drained, moderately permeable soils on uplands. These soils formed in calcareous loess. Slope ranges from 20 to 60 percent.

Typical pedon of Hamburg silt loam, 20 to 60 percent slopes, 210 feet north and 120 feet east of the southwest corner of sec. 25, T. 20 N., R. 7 W.

A—0 to 6 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak very fine and fine granular structure; friable; many fine roots; common faint dark brown (10YR 3/3) organic coatings on faces of peds; slight effervescence; moderately alkaline; abrupt smooth boundary.

AC—6 to 13 inches; yellowish brown (10YR 5/4) silt loam; moderate very fine and fine granular structure; friable; common very fine and fine roots; few faint dark brown (10YR 3/3) organic coatings on faces of peds; strong effervescence; moderately alkaline; clear smooth boundary.

C1—13 to 21 inches; yellowish brown (10YR 5/4) silt; moderate very fine and fine granular structure; friable; common very fine and fine roots; strong effervescence; moderately alkaline; gradual smooth boundary.

C2—21 to 60 inches; light yellowish brown (10YR 6/4) silt; massive; friable; few very fine and fine roots; few fine and medium concretions of calcium carbonate; strong effervescence; moderately alkaline.

Thickness of the solum ranges from 4 to 15 inches.

The A horizon has chroma of 3 or 4. The C horizon has value of 4 to 6 and chroma of 3 to 6. It is silt or silt loam.

Harpster Series

The Harpster series consists of poorly drained, moderately permeable soils on stream terraces. These soils formed in calcareous loess or outwash. Slope ranges from 0 to 2 percent.

Typical pedon of Harpster silty clay loam, 858 feet north and 165 feet west of the southeast corner of sec. 4, T. 21 N., R. 6 W.

Apk—0 to 8 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; common very fine roots; common fine snail shells; strong effervescence (7 percent calcium carbonate equivalent); moderately alkaline; abrupt smooth boundary.

Ak—8 to 15 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; weak medium subangular blocky structure; firm; common very fine roots; many fine and medium snail shells; strong effervescence (10 percent calcium carbonate equivalent); moderately alkaline; clear smooth boundary.

Bkg1—15 to 20 inches; dark gray (5Y 4/1) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; many fine and medium snail shells; very dark gray (10YR 3/1) krotovinas; strong effervescence (25 percent calcium carbonate equivalent); moderately alkaline; clear smooth boundary.

Bkg2—20 to 27 inches; light olive gray (5Y 6/2) silt loam; common fine prominent dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; few fine and medium snail shells; dark gray (5Y 4/1) krotovinas; strong effervescence (49 percent calcium carbonate equivalent); moderately alkaline; gradual smooth boundary.

Bkg3—27 to 37 inches; light olive gray (5Y 6/2) silt loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; friable; few very fine roots; few fine and medium snail shells; strong effervescence (55 percent calcium carbonate equivalent); strongly alkaline; gradual smooth boundary.

BCkg—37 to 46 inches; olive gray (5Y 5/2) silt loam; many fine prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; friable; few fine and medium snail shells; strong effervescence (40 percent calcium carbonate equivalent); strongly alkaline; clear smooth boundary.

2Cg—46 to 60 inches; olive (5Y 5/3), stratified loam and sandy loam; few fine prominent yellowish brown (10YR 5/6) mottles; massive; friable; few fine snail

shells; strong effervescence (23 percent calcium carbonate equivalent); strongly alkaline.

Thickness of the solum ranges from 34 to 46 inches. Thickness of the mollic epipedon ranges from 10 to 18 inches.

The Apk and Ak horizons have value of 2 or 3. They are silty clay loam or silt loam. The Bkg horizon has hue of 10YR, 2.5Y, or 5Y and value of 4 to 6. The 2Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 to 6. It is silt loam, loam, or sandy loam.

Hartsburg Series

The Hartsburg series consists of poorly drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Hartsburg silty clay loam, 120 feet north and 1,546 feet west of the southeast corner of sec. 15, T. 20 N., R. 5 W.

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; weak medium subangular blocky structure parting to weak fine granular; friable; many very fine roots; neutral; abrupt smooth boundary.

A—8 to 16 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; common fine distinct dark grayish brown (2.5Y 4/2) mottles; weak very fine and fine subangular blocky structure; friable; common very fine roots; neutral; clear smooth boundary.

Bg—16 to 23 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) and faint light brownish gray (2.5Y 6/2) mottles; moderate fine and medium subangular blocky structure; friable; common very fine roots; many distinct dark grayish brown (2.5Y 4/2) coatings and very dark grayish brown (2.5Y 3/2) organic coatings on faces of peds and in root channels; neutral; clear smooth boundary.

Bkg1—23 to 30 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/8) and coarse faint light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; friable; few very fine roots; common distinct dark grayish brown (2.5Y 4/2) coatings on faces of peds and in root channels; few fine concretions of calcium carbonate; violent effervescence; moderately alkaline; clear smooth boundary.

Bkg2—30 to 38 inches; mottled light olive gray (5Y 6/2) and yellowish brown (10YR 5/8) silt loam; moderate medium subangular blocky structure; friable; few very fine roots; few distinct dark grayish brown (2.5Y 4/2) coatings in root channels; common medium and coarse concretions of calcium carbonate; few medium accumulations of iron and manganese oxide; violent effervescence; moderately alkaline; clear smooth boundary.

Cg—38 to 60 inches; light olive gray (5Y 6/2) silt loam; many medium prominent yellowish brown (10YR 5/8) mottles; massive; friable; few very fine roots; common medium accumulations of iron and manganese oxide; very dark gray (10YR 3/1) krotovinas; strong effervescence; moderately alkaline.

Thickness of the solum ranges from 30 to 42 inches. Thickness of the mollic epipedon ranges from 12 to 20 inches. The depth to free carbonates ranges from 20 to 35 inches.

The Ap and A horizons have chroma of 1 or 2. The Bg or Bkg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 or 2.

Houghton Series

The Houghton series consists of very poorly drained, moderately permeable soils in lake basins and on stream terraces. These soils formed in organic material. Slope ranges from 0 to 2 percent.

Typical pedon of Houghton muck, 677 feet north and 1,079 feet east of the southwest corner of sec. 25, T. 23 N., R. 6 W.

Op—0 to 9 inches; sapric material, black (N 2/0) broken face and rubbed, black (N 2/0) dry; about 1 percent fiber, a trace rubbed; weak very fine granular structure; friable; common very fine roots; moderately acid; clear smooth boundary.

Oa1—9 to 20 inches; sapric material, black (10YR 2/1) broken face and rubbed, black (10YR 2/1) dry; common medium distinct dark reddish brown (5YR 3/2) mottles; about 1 percent fiber, a trace rubbed; weak very fine and fine subangular blocky structure; friable; common very fine roots; slightly acid; gradual smooth boundary.

Oa2—20 to 41 inches; sapric material, black (10YR 2/1) broken face and rubbed, black (10YR 2/1) dry; about 25 percent fiber, 5 percent rubbed; weak medium subangular blocky structure; friable; few very fine roots; neutral; gradual smooth boundary.

Oa3—41 to 60 inches; sapric material, black (10YR 2/1) broken face and rubbed, black (10YR 2/1) dry; about 3 percent fiber, a trace rubbed; weak medium subangular blocky structure; friable; neutral.

Thickness of the solum and of the organic layer is

more than 51 inches. The organic material is derived primarily from herbaceous plants.

The surface tier has hue of 10YR or is neutral in hue. It has chroma of 0 or 1. The subsurface tiers have hue of 5YR, 7.5YR, or 10YR or are neutral in hue. They have chroma of 0 to 2.

Ipava Series

The Ipava series consists of somewhat poorly drained, moderately slowly permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Ipava silt loam, 420 feet south and 291 feet east of the northwest corner of sec. 24, T. 20 N., R. 6 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak very fine granular structure; friable; many very fine roots; moderately acid; clear smooth boundary.

A—8 to 14 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; common very fine roots; moderately acid; gradual smooth boundary.

AB—14 to 20 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; weak very fine and fine subangular blocky structure; friable; few very fine roots; moderately acid; clear smooth boundary.

Bt1—20 to 26 inches; dark brown (10YR 4/3) silty clay loam; many fine distinct yellowish brown (10YR 5/6) and pale brown (10YR 6/3) and many coarse faint dark grayish brown (10YR 4/2) mottles; moderate fine subangular blocky structure; friable; few very fine roots; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions and accumulations of iron and manganese oxide; moderately acid; clear smooth boundary.

Bt2—26 to 37 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct yellowish brown (10YR 5/8) and light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; many distinct very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions and accumulations of iron and manganese oxide; moderately acid; clear smooth boundary.

Bt3—37 to 44 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct yellowish brown (10YR 5/8) and common medium distinct light brownish gray (10YR 6/2) mottles; weak medium prismatic structure; friable; few very fine roots; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; many distinct very dark grayish brown (10YR 3/2) clay films in root channels; few fine dark concretions and accumulations of iron and manganese oxide; moderately acid; clear smooth boundary.

C—44 to 60 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct yellowish brown (10YR 5/8) and common medium distinct light brownish gray (10YR 6/2) mottles; massive; friable; many distinct very dark grayish brown (10YR 3/2) clay films in root channels; few fine dark concretions and accumulations of iron and manganese oxide; slightly acid.

Thickness of the solum ranges from 40 to 60 inches. Thickness of the mollic epipedon ranges from 12 to 24 inches.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4.

Landes Series

The Landes series consists of well drained soils on flood plains. These soils formed in alluvium. Permeability is moderately rapid. Slope ranges from 0 to 2 percent.

Typical pedon of Landes sandy loam, frequently flooded, 1,205 feet north and 900 feet east of the southwest corner of sec. 2, T. 19 N., R. 11 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to weak fine granular; friable; common very fine roots; neutral; clear smooth boundary.

A—8 to 14 inches; very dark grayish brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; neutral; clear smooth boundary.

BA—14 to 21 inches; dark brown (10YR 3/3) sandy loam, brown (10YR 5/3) dry; weak medium subangular blocky structure; friable; few very fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; gradual smooth boundary.

Bw1—21 to 30 inches; dark brown (10YR 4/3) sandy loam; moderate medium subangular blocky structure; friable; few very fine roots; common

distinct dark brown (10YR 3/3) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bw2—30 to 37 inches; dark yellowish brown (10YR 4/4) sandy loam; moderate medium subangular blocky structure; friable; few very fine roots; common distinct dark brown (10YR 4/3) coatings on faces of peds; slightly acid; clear smooth boundary.

C1—37 to 42 inches; brown (7.5YR 4/4) loamy sand and sand; single grain; loose; few very fine roots; about 2 percent fine gravel; slightly acid; clear smooth boundary.

C2—42 to 60 inches; brown (7.5YR 5/4) sand; single grain; loose; few thin strata of loamy sand; about 2 percent fine and medium gravel; slightly acid.

Thickness of the solum ranges from 30 to 40 inches. Thickness of the mollic epipedon ranges from 10 to 24 inches. The content of organic carbon decreases irregularly with increasing depth. It is more than 0.3 percent in some subhorizons above a depth of 50 inches.

The Ap and A horizons have chroma of 1 or 2. They are sandy loam or fine sandy loam. The Bw horizon has value of 4 or 5. It is sandy loam, fine sandy loam, or loam.

Lawndale Series

The Lawndale series consists of somewhat poorly drained soils on uplands. These soils formed in loess and in the underlying sandy eolian deposits. Permeability is moderate in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 2 percent.

Typical pedon of Lawndale silt loam, 510 feet south and 2,547 feet east of the northwest corner of sec. 24, T. 21 N., R. 5 W.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; few very fine roots; neutral; clear smooth boundary.

A—8 to 13 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; weak very fine subangular blocky structure; friable; few very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

BA—13 to 16 inches; mottled brown (10YR 5/3) and dark grayish brown (10YR 4/2) silty clay loam; weak very fine and fine subangular blocky structure; friable; few very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—16 to 23 inches; brown (10YR 5/3) silty clay loam; many medium prominent strong brown (7.5YR 5/6) and common medium faint grayish brown (10YR 5/2) mottles; moderate fine and medium subangular blocky structure; friable; few very fine roots; common distinct grayish brown (10YR 5/2) and dark grayish brown (10YR 4/2) clay films on faces of peds; common fine dark concretions and accumulations of iron and manganese oxide; slightly acid; gradual smooth boundary.

Bt2—23 to 34 inches; light olive brown (2.5Y 5/4) silty clay loam; common medium distinct yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct grayish brown (10YR 5/2) and dark grayish brown (10YR 4/2) clay films on faces of peds; common fine and medium dark concretions and accumulations of iron and manganese oxide; neutral; gradual smooth boundary.

Bt3—34 to 43 inches; light olive brown (2.5Y 5/4) silt loam; common medium distinct yellowish brown (10YR 5/6) and few fine prominent light brownish gray (10YR 6/2) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few very fine roots; few distinct olive brown (2.5Y 4/4) clay films on faces of peds; few fine and medium dark concretions and accumulations of iron and manganese oxide; neutral; clear smooth boundary.

2BC—43 to 52 inches; dark yellowish brown (10YR 4/4) loamy fine sand; weak medium subangular blocky structure; very friable; few very fine roots; neutral; clear smooth boundary.

2C—52 to 60 inches; yellowish brown (10YR 5/6) fine sand; single grain; loose; neutral.

Thickness of the solum ranges from 45 to more than 60 inches. Thickness of the loess ranges from 40 to 60 inches. The mollic epipedon is 10 to 22 inches thick.

The Ap and A horizons have value of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 2 to 4. The 2BC horizon has value of 4 or 5 and chroma of 4 to 6. It is fine sandy loam, loamy fine sand, or fine sand. The 2C horizon is loamy fine sand or fine sand.

Marshan Series

The Marshan series consists of poorly drained soils on stream terraces. These soils formed in loamy outwash underlain by sandy deposits. Permeability is moderate in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 2 percent.

Typical pedon of Marshan loam, 2,511 feet south and

965 feet west of the northeast corner of sec. 1, T. 21 N., R. 7 W.

Ap—0 to 9 inches; black (N 2/0) loam, very dark gray (10YR 3/1) dry; weak fine subangular blocky structure; friable; few very fine roots; moderately acid; clear smooth boundary.

A—9 to 15 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; few fine prominent dark grayish brown (2.5Y 4/2) mottles; moderate fine and medium subangular blocky structure; friable; few very fine roots; many faint black (N 2/0) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

BAg—15 to 20 inches; dark gray (10YR 4/1) loam; common fine prominent dark grayish brown (2.5Y 4/2) mottles; moderate medium subangular blocky structure; friable; few very fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

Bg1—20 to 27 inches; grayish brown (2.5Y 5/2) loam; many fine prominent yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds and in root channels; slightly acid; gradual smooth boundary.

Bg2—27 to 38 inches; grayish brown (2.5Y 5/2) loam; many medium prominent yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) and common fine prominent gray (10YR 5/1) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; few distinct dark gray (10YR 4/1) coatings on faces of peds; few distinct very dark gray (10YR 3/1) organic coatings in root channels; slightly acid; abrupt smooth boundary.

2Cg—38 to 60 inches; grayish brown (2.5Y 5/2) sand; many coarse prominent yellowish brown (10YR 5/6) mottles; single grain; loose; few very fine roots; neutral.

Thickness of the solum and depth to the sandy deposits range from 30 to 40 inches. The mollic epipedon ranges from 12 to 24 inches in thickness. The 2C horizon has as much as 50 percent gravel.

The Ap and A horizons have value of 2 or 3. They are loam or clay loam. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 or 2. It is loam, clay loam, or sandy loam. The 2Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 2 to 6. It is sand, loamy sand, or the gravelly analogs of these textures. Some thin strata are very gravelly.

Maumee Series

The Maumee series consists of poorly drained, rapidly permeable soils on stream terraces. These soils formed in sandy outwash. Slope ranges from 0 to 2 percent.

Typical pedon of Maumee loamy sand, 425 feet south and 750 feet east of the northwest corner of sec. 1, T. 19 N., R. 10 W.

Ap—0 to 7 inches; very dark gray (10YR 3/1) loamy sand, gray (10YR 5/1) dry; few fine prominent dark brown (7.5YR 4/4) mottles; weak fine granular structure; very friable; few very fine roots; moderately acid; clear smooth boundary.

A—7 to 12 inches; very dark gray (10YR 3/1) loamy sand, gray (10YR 5/1) dry; common fine prominent dark brown (7.5YR 3/4 and 4/4) mottles; weak medium subangular blocky structure; very friable; few very fine roots; slightly acid; gradual smooth boundary.

AB—12 to 18 inches; very dark grayish brown (10YR 3/2) loamy sand, grayish brown (10YR 5/2) dry; common fine prominent strong brown (7.5YR 4/6) mottles; weak medium subangular blocky structure; very friable; few very fine roots; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; moderately acid; gradual smooth boundary.

Bg1—18 to 24 inches; dark gray (10YR 4/1) loamy sand; common fine distinct brown (10YR 4/3) mottles; weak medium subangular blocky structure; very friable; few very fine roots; moderately acid; clear smooth boundary.

Bg2—24 to 31 inches; dark grayish brown (2.5Y 4/2) loamy sand; common medium prominent strong brown (7.5YR 4/6) mottles; weak medium subangular blocky structure; very friable; few very fine roots; moderately acid; clear smooth boundary.

BCg—31 to 37 inches; grayish brown (2.5Y 5/2) sand; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable; few very fine roots; moderately acid; clear smooth boundary.

Cg—37 to 60 inches; light brownish gray (2.5Y 6/2) sand; common medium prominent yellowish brown (10YR 5/6) mottles; single grain; loose; few very fine roots; slightly acid.

Thickness of the solum ranges from 15 to 40 inches. Thickness of the mollic epipedon ranges from 15 to 24 inches.

The Ap and A horizons have value of 2 or 3. The Bg horizon has value of 4 or 5. The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 or 3. It is sand or loamy sand.

Medway Series

The Medway series consists of moderately well drained, moderately permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Typical pedon of Medway silty clay loam, frequently flooded, 1,080 feet north and 1,260 feet east of the southwest corner of sec. 7, T. 20 N., R. 9 W.

A1—0 to 5 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak medium subangular blocky structure parting to moderate fine granular; friable; common very fine roots; common fine strong brown (7.5YR 4/6) accumulations of iron and manganese oxide; neutral; clear smooth boundary.

A2—5 to 11 inches; black (10YR 2/1) silty clay loam, gray (10YR 5/1) dry; weak medium subangular blocky structure parting to weak fine granular; friable; common very fine and fine roots; neutral; abrupt smooth boundary.

BA—11 to 15 inches; dark grayish brown (10YR 4/2) silt loam; common fine faint dark gray (10YR 4/1) mottles; weak fine and medium subangular blocky structure; friable; common very fine and fine roots; neutral; gradual smooth boundary.

Bw1—15 to 23 inches; dark grayish brown (10YR 4/2) loam; common fine faint dark brown (10YR 4/3) mottles; weak fine and medium subangular blocky structure; friable; common very fine and fine roots; neutral; gradual smooth boundary.

Bw2—23 to 31 inches; dark grayish brown (10YR 4/2) clay loam; many medium faint dark brown (10YR 4/3) and common medium prominent dark brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; friable; few very fine roots; common fine and medium concretions of iron and manganese oxide; neutral; gradual smooth boundary.

Bw3—31 to 37 inches; dark brown (10YR 4/3) clay loam; common medium prominent strong brown (7.5YR 4/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; common fine and medium concretions of iron and manganese oxide; neutral; gradual smooth boundary.

BC—37 to 42 inches; dark yellowish brown (10YR 4/4) clay loam; common medium prominent strong brown (7.5YR 5/6) and distinct grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; common fine concretions of iron and manganese oxide; neutral; gradual smooth boundary.

C—42 to.60 inches; yellowish brown (10YR 5/4) clay loam; common medium prominent strong brown (7.5YR 5/6) and distinct grayish brown (10YR 5/2) mottles; massive; friable; common fine concretions of iron and manganese oxide; neutral.

Thickness of the solum ranges from 36 to 50 inches. Thickness of the mollic epipedon ranges from 10 to 24 inches. The content of organic carbon decreases irregularly with increasing depth. It is more than 0.3 percent in some subhorizons above a depth of 50 inches.

The Ap or A horizon has chroma of 1 or 2. It is silty clay loam, loam, or silt loam. The Bw horizon has value of 4 or 5. The C horizon is sandy loam, loam, clay loam, or loamy sand.

Middletown Series

The Middletown series consists of well drained soils on uplands. These soils formed in loess and in the underlying sandy eolian deposits. Permeability is moderate in the upper part of the profile and rapid in the lower part. Slope ranges from 5 to 10 percent.

Typical pedon of Middletown silt loam, 5 to 10 percent slopes, eroded, 2,355 feet south and 495 feet west of the northeast corner of sec. 25, T. 20 N., R. 7 W.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; common very fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; moderately acid; clear smooth boundary.

E—3 to 7 inches; dark brown (10YR 4/3) silt loam that is mixed with brown (7.5YR 4/4) subsoil material in the lower part, pale brown (10YR 6/3) dry; weak thin platy structure; friable; common very fine roots; many faint very dark grayish brown (10YR 3/2) organic coatings and few prominent white (10YR 8/1 dry) silt coatings on faces of peds; strongly acid; abrupt smooth boundary.

Bt1—7 to 11 inches; brown (7.5YR 4/4) silt loam that is mixed with very dark grayish brown (10YR 3/2) material from the surface layer in the upper part; weak very fine and fine subangular blocky structure; friable; few very fine roots; common distinct dark brown (7.5YR 3/4) clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt2—11 to 24 inches; brown (7.5YR 4/4) silty clay loam; moderate very fine and fine subangular blocky structure; friable; few very fine roots; many distinct dark brown (7.5YR 3/4) clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt3—24 to 36 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; many distinct dark brown (10YR 4/3) clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt4—36 to 46 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; few very fine roots; common distinct dark brown (10YR 4/3) clay films on faces of peds; moderately acid; gradual smooth boundary.

2Bt5—46 to 55 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium and coarse subangular blocky structure; friable; few very fine roots; few distinct dark brown (10YR 4/3) clay films on faces of peds; moderately acid; gradual smooth boundary.

2BC—55 to 60 inches; dark yellowish brown (10YR 4/6) loamy fine sand; weak medium subangular blocky structure; very friable; slightly acid.

Thickness of the solum ranges from 50 to more than 60 inches. Thickness of the loess ranges from 40 to 60 inches.

The Ap or A horizon has value of 3 or 4 and chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. It has 5 to 15 percent fine sand or very fine sand in the lower part. The 2Bt horizon is fine sandy loam or loam. The 2BC horizon has value of 4 or 5 and chroma of 4 to 6. It is loamy fine sand or fine sand.

Onarga Series

The Onarga series consists of well drained soils on stream terraces and uplands. These soils formed in outwash or eolian deposits. Permeability is moderately rapid in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 10 percent.

Typical pedon of Onarga sandy loam, 0 to 2 percent slopes, 70 feet north and 171 feet west of the center of sec. 18, T. 22 N., R. 6 W.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) sandy loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; common very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; abrupt smooth boundary.

A—10 to 18 inches; very dark grayish brown (10YR 3/2) sandy loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; common very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; abrupt smooth boundary.

Bt1—18 to 25 inches; dark brown (10YR 4/3) sandy loam; moderate medium subangular blocky structure; friable; common very fine roots; common distinct dark brown (10YR 3/3) clay films and many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; clear smooth boundary.

Bt2—25 to 33 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct dark brown (10YR 3/3) clay films on faces of peds; moderately acid; clear smooth boundary.

2BC—33 to 36 inches; dark yellowish brown (10YR 4/6) loamy sand; weak medium prismatic structure parting to weak medium subangular blocky; very friable; few very fine roots; moderately acid; gradual smooth boundary.

2C—36 to 60 inches; dark yellowish brown (10YR 4/6) sand; single grain; loose; moderately acid.

Thickness of the solum ranges from 30 to 50 inches. The mollic epipedon is 10 to 24 inches thick.

The Ap and A horizons have value of 2 or 3 and chroma of 1 to 3. They are sandy loam or fine sandy loam. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. It is sandy loam, fine sandy loam, or loam. The 2C horizon is sand, fine sand, loamy sand, loamy fine sand, sandy loam, or fine sandy loam.

Onarga fine sandy loam, 5 to 10 percent slopes, eroded, has a thinner surface layer than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soil.

Orio Series

The Orio series consists of poorly drained soils on stream terraces. These soils formed in outwash. Permeability is moderately slow in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 2 percent.

Typical pedon of Orio loam, 158 feet south and 2,569 feet east of the northwest corner of sec. 35, T. 21 N., R. 7 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few very fine roots; slightly acid; abrupt smooth boundary.

Eg1—9 to 17 inches; grayish brown (10YR 5/2) fine sandy loam, light brownish gray (10YR 6/2) dry;

common medium prominent strong brown (7.5YR 4/6) and faint dark grayish brown (10YR 4/2) mottles; weak medium platy structure; friable; few very fine roots; few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine and medium concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

Eg2—17 to 25 inches; light brownish gray (2.5Y 6/2) fine sandy loam, light gray (2.5Y 7/2) dry; few medium prominent dark yellowish brown (10YR 4/4) mottles; weak medium platy structure; friable; few very fine roots; many distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine and medium concretions of iron and manganese oxide; moderately acid; clear smooth boundary.

2Btg1—25 to 32 inches; gray (5Y 5/1) clay loam; common fine prominent strong brown (7.5YR 5/6) mottles; moderate medium and coarse subangular blocky structure; firm; few very fine roots; common distinct dark gray (5Y 4/1) clay films and few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; moderately acid; clear smooth boundary.

2Btg2—32 to 37 inches; light gray (5Y 6/1) silty clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; moderate medium and coarse subangular blocky structure; firm; few very fine roots; common distinct gray (5Y 5/1) clay films on faces of peds; moderately acid; clear smooth boundary.

2Btg3—37 to 47 inches; gray (5Y 5/1) clay loam; many medium faint light gray (5Y 6/1) and few fine prominent strong brown (7.5YR 5/6) mottles; weak medium prismatic structure parting to moderate medium and coarse subangular blocky; firm; few very fine roots; few distinct dark gray (5Y 4/1) clay films on faces of peds; moderately acid; clear smooth boundary.

3Cg—47 to 60 inches; grayish brown (10YR 5/2) loamy sand that has bands of sandy loam; massive; very friable; few very fine roots; slightly acid.

Thickness of the solum ranges from 40 to 60 inches. The dark surface layer is 6 to 10 inches thick.

The Ap or A horizon has value of 2 or 3 and chroma of 1 or 2. It is loam, fine sandy loam, or sandy loam. The Eg horizon has value of 4 to 6 and chroma of 1 or 2. It is loam, sandy loam, fine sandy loam, or loamy sand. The 2Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. It is loam, clay loam, fine sandy loam, sandy loam, or silty clay loam. The 3Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. It is sand, loamy sand, sandy loam, or loam.

Palms Series

The Palms series consists of very poorly drained, moderately permeable soils in lake basins and on stream terraces. These soils formed in organic material underlain by loamy mineral deposits. Slope ranges from 0 to 2 percent.

Typical pedon of Palms muck, 2,435 feet north and 1,415 feet east of the southwest corner of sec. 23, T. 23 N., R. 6 W.

Op—0 to 8 inches; sapric material, black (N 2/0) broken face and rubbed, very dark gray (10YR 3/1) dry; less than 5 percent fiber unrubbed and rubbed; weak medium subangular blocky structure parting to weak very fine and fine granular; friable; common very fine and fine roots; neutral; clear smooth boundary.

Oa1—8 to 18 inches; sapric material, black (N 2/0) broken face and rubbed, very dark gray (10YR 3/1) dry; less than 5 percent fiber unrubbed and rubbed; weak medium subangular blocky structure parting to weak fine granular; friable; common very fine and fine roots; neutral; clear smooth boundary.

Oa2—18 to 24 inches; sapric material, black (5YR 2.5/1) broken face and rubbed, dark grayish brown (10YR 4/2) dry; less than 5 percent fiber unrubbed and rubbed; weak medium subangular blocky structure; friable; common very fine roots; few thin grayish brown (2.5Y 5/2) sand lenses; neutral; clear smooth boundary.

2Cg1—24 to 31 inches; grayish brown (2.5Y 5/2) silt loam; many coarse prominent dark gray (5Y 4/1) and common medium prominent dark brown (7.5YR 4/4) mottles; massive; friable; few very fine roots; neutral; clear smooth boundary.

2Cg2—31 to 45 inches; light brownish gray (2.5Y 6/2) silt loam; many coarse prominent strong brown (7.5YR 5/6) mottles; massive; friable; neutral; gradual smooth boundary.

2Cg3—45 to 60 inches; gray (5Y 5/1) silt loam that has a few thin strata of sand; many medium prominent yellowish brown (10YR 5/6) and light brownish gray (2.5Y 6/2) mottles; massive; friable; neutral.

Thickness of the solum and of the organic layer ranges from 16 to 50 inches. The organic material is derived primarily from herbaceous plants.

The surface tier has hue of 10YR or is neutral in hue. It has chroma of 0 or 1. The subsurface tiers have hue of 5YR, 7.5YR, or 10YR or are neutral in hue. They have value of 2 or 3 and chroma of 0 to 2. The 2Cg horizon has hue of 10YR, 2.5Y, or 5Y and value of 4 to 6. It is sandy loam, loam, or silt loam.

Pella Series

The Pella series consists of poorly drained, moderately permeable soils on stream terraces. These soils formed in loess or silty material and in the underlying stratified outwash. Slope ranges from 0 to 2 percent.

Typical pedon of Pella silty clay loam, 1,263 feet north and 1,146 feet west of the southeast corner of sec. 11, T. 21 N., R. 6 W.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; slightly acid; clear smooth boundary.

A—9 to 13 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; common fine distinct dark brown (10YR 4/3) mottles; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; common faint black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg—13 to 17 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine distinct brown (10YR 5/3) mottles; weak fine subangular blocky structure; friable; few very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Btg1—17 to 24 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium faint dark grayish brown (2.5Y 4/2) and common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few very fine roots; common distinct dark grayish brown (2.5Y 4/2) clay films and few distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Btg2—24 to 29 inches; light brownish gray (2.5Y 6/2) silty clay loam; many medium faint grayish brown (2.5Y 5/2) and common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine and medium dark accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Btg3—29 to 34 inches; light brownish gray (2.5Y 6/2) silty clay loam; many medium prominent yellowish brown (10YR 5/6) and faint grayish brown (2.5Y 5/2) mottles; weak medium subangular blocky structure; friable; few very fine roots; few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; dark gray (10YR 4/1) krotovinas; slightly alkaline; clear smooth boundary.

2BCkg—34 to 41 inches; light brownish gray (2.5Y 6/2) silt loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine and medium concretions of calcium carbonate; strong effervescence; moderately alkaline; gradual smooth boundary.

2Cg1—41 to 56 inches; light brownish gray (2.5Y 6/2) silt loam; many coarse prominent yellowish brown (10YR 5/6) mottles; massive; friable; common strata of loam; strong effervescence; moderately alkaline; abrupt smooth boundary.

2Cg2—56 to 60 inches; yellowish brown (10YR 5/6) sandy loam and loamy sand; common medium distinct brown (10YR 5/3) mottles; massive; very friable; strong effervescence; moderately alkaline.

Thickness of the solum ranges from 36 to 48 inches. The depth to free carbonates ranges from 18 to 40 inches. Thickness of the mollic epipedon ranges from 12 to 24 inches.

The Ap and A horizons have hue of 10YR or are neutral in hue. They have chroma of 0 to 2. The Bg or Btg horizon has hue of 10YR, 2.5Y, or 5Y and chroma of 1 or 2. The 2BCkg horizon is silt loam, loam, or sandy loam.

Pillot Series

The Pillot series consists of well drained soils on uplands and stream terraces. These soils formed in loess or silty material and loamy or sandy material underlain by sandy deposits. Permeability is moderate in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 10 percent.

Typical pedon of Pillot silt loam, 2 to 5 percent slopes, 2,385 feet south and 513 feet west of the northeast corner of sec. 16, T. 20 N., R. 6 W.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, dark brown (10YR 4/3) dry; weak fine granular structure; friable; few very fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

A—7 to 12 inches; very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) silt loam, dark brown (10YR 4/3) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; slightly acid; clear smooth boundary.

Bt1—12 to 18 inches; dark brown (10YR 4/3) silty clay

loam; weak fine subangular blocky structure; friable; few very fine roots; common distinct dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—18 to 24 inches; dark brown (10YR 4/3) and dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct dark brown (10YR 3/3) clay films on faces of peds; very dark grayish brown (10YR 3/2) wormcasts; slightly acid; clear smooth boundary.

Bt3—24 to 31 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct dark brown (10YR 4/3 and 3/3) clay films on faces of peds; very dark grayish brown (10YR 3/2) wormcasts; slightly acid; clear smooth boundary.

2Bt4—31 to 36 inches; dark yellowish brown (10YR 4/4) loam; weak medium subangular blocky structure; friable; few very fine roots; common distinct dark brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

2C—36 to 60 inches; yellowish brown (10YR 5/4) loamy fine sand and fine sand; single grain; loose; few very fine roots; slightly acid.

Thickness of the solum ranges from 26 to 45 inches. Thickness of the loess or silty material ranges from 23 to 40 inches. The mollic epipedon is 10 to 20 inches thick.

The Ap and A horizons have chroma of 1 to 3. The Bt horizon has value of 4 or 5. The 2Bt horizon is loam, fine sandy loam, or loamy fine sand. The 2C horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. It is loamy sand, sand, loamy fine sand, or fine sand.

Pillot silt loam, 5 to 10 percent slopes, eroded, has a thinner dark surface layer than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soil.

Plainfield Series

The Plainfield series consists of excessively drained, rapidly permeable soils on dunes, stream terraces, and uplands. These soils formed in wind- and water-deposited sands. Slope ranges from 1 to 30 percent.

Typical pedon of Plainfield sand, 1 to 7 percent slopes, 795 feet south and 2,205 feet east of the northwest corner of sec. 12, T. 22 N., R. 8 W.

Ap—0 to 9 inches; dark brown (10YR 4/3) sand, brown (10YR 5/3) dry; weak very fine granular structure; very friable; few very fine roots; moderately acid; clear smooth boundary.

Bw1—9 to 16 inches; dark yellowish brown (10YR 4/6) sand; weak fine subangular blocky structure; very friable; few very fine roots; strongly acid; clear smooth boundary.

Bw2—16 to 24 inches; yellowish brown (10YR 5/6) sand; weak fine and medium subangular blocky structure; very friable; few very fine roots; strongly acid; clear smooth boundary.

BC—24 to 31 inches; yellowish brown (10YR 5/6) sand; weak medium subangular blocky structure; very friable; few very fine roots; very strongly acid; clear smooth boundary.

C—31 to 60 inches; yellowish brown (10YR 5/8) sand; single grain; loose; few fine roots; strongly acid.

Thickness of the solum ranges from 12 to 40 inches.

The Ap horizon has value of 3 or 4 and chroma of 2 or 3. In uncultivated areas the A horizon has value of 2 or 3 and chroma of 1 to 3. The Bw horizon has chroma of 4 to 6.

Plano Series

The Plano series consists of well drained, moderately permeable soils on stream terraces. These soils formed in loess or other silty material and in the underlying outwash. Slope ranges from 0 to 5 percent.

Typical pedon of Plano silt loam, 0 to 2 percent slopes, 2,224 feet south and 570 feet east of the northwest corner of sec. 23, T. 21 N., R. 6 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

A—8 to 14 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; few very fine roots; slightly acid; clear smooth boundary.

BA—14 to 20 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate very fine and fine subangular blocky structure; friable; common very fine and fine roots; many faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; gradual smooth boundary.

Bt1—20 to 29 inches; dark brown (10YR 4/3) silty clay loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; many distinct dark brown (10YR 3/3) clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt2—29 to 37 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; many distinct dark brown (10YR 3/3 and 4/3) clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt3—37 to 49 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure parting to moderate medium and coarse subangular blocky; friable; few very fine roots; many distinct dark brown (10YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.

2Bt4—49 to 60 inches; dark yellowish brown (10YR 4/4) loam; weak medium prismatic structure parting to weak medium and coarse subangular blocky; friable; few distinct dark brown (10YR 4/3) clay films on faces of peds and in root channels; moderately acid.

Thickness of the solum ranges from 44 to more than 60 inches. Thickness of the loess or silty material ranges from 40 to 60 inches. The mollic epipedon is 10 to 20 inches thick.

The Ap and A horizons have chroma of 1 to 3. The Bt horizon has value of 4 or 5. The 2Bt horizon is loam, sandy loam, or silt loam.

Proctor Series

The Proctor series consists of well drained soils on stream terraces. These soils formed in loess or other silty material and loamy outwash underlain by sandy deposits. Permeability is moderate in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 2 percent.

Typical pedon of Proctor silt loam, sandy substratum, 1,680 feet south and 300 feet west of the northeast corner of sec. 36, T. 20 N., R. 5 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; common very fine and fine roots; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; strongly acid; clear smooth boundary.

A—9 to 17 inches; very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; strongly acid; clear smooth boundary.

Bt1—17 to 22 inches; brown (10YR 4/3) silty clay loam, brown (10YR 5/3) dry; moderate very fine and fine subangular blocky structure; friable; few very fine roots; common distinct dark brown (10YR 3/3) clay films and few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; clear smooth boundary.

Bt2—22 to 26 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; few very fine roots; many distinct brown (10YR 4/3) and dark brown (10YR 3/3) clay films on faces of peds; moderately acid; clear smooth boundary.

Bt3—26 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; few very fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

2Bt4—30 to 37 inches; dark yellowish brown (10YR 4/4) clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.

2Bt5—37 to 43 inches; dark yellowish brown (10YR 4/4) loam; weak medium prismatic structure parting to moderate medium and coarse subangular blocky; friable; few very fine roots; few distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.

2BC—43 to 50 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium subangular blocky structure; very friable; few very fine roots; about 3 percent fine and medium gravel; few strata of loamy sand; moderately acid; gradual smooth boundary.

2C—50 to 60 inches; brown (7.5YR 4/4) coarse sand; single grain; loose; about 5 percent fine and medium gravel; moderately acid.

Thickness of the solum ranges from 40 to 55 inches. Thickness of the loess or silty material ranges from 24 to 40 inches. The mollic epipedon is 12 to 20 inches thick.

The Ap and A horizons have chroma of 1 to 3. The Bt horizon has value of 4 or 5. It contains 5 to 15 percent fine sand or very fine sand. The 2Bt horizon has value of 4 or 5 and chroma of 4 to 6. The 2C horizon is sand, coarse sand, loamy sand, or the gravelly analogs of these textures.

Raddle Series

The Raddle series consists of well drained, moderately permeable soils on upland foot slopes. These soils formed in colluvium. Slope ranges from 2 to 5 percent.

Typical pedon of Raddle silt loam, 2 to 5 percent

slopes, 1,620 feet north and 1,230 feet east of the southwest corner of sec. 32, T. 20 N., R. 6 W.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, dark brown (10YR 4/3) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; moderately acid; gradual smooth boundary.

A—7 to 15 inches; very dark grayish brown (10YR 3/2) silt loam, dark brown (10YR 4/3) dry; weak fine and medium subangular blocky structure; friable; few very fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; moderately acid; gradual smooth boundary.

AB—15 to 21 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate medium subangular blocky structure; friable; few very fine roots; many faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; gradual smooth boundary.

Bw1—21 to 28 inches; dark brown (10YR 4/3) silt loam; moderate medium subangular blocky structure; friable; few very fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

Bw2—28 to 38 inches; dark brown (10YR 4/3) silt loam; moderate medium subangular blocky structure; friable; few very fine roots; common distinct dark brown (10YR 3/3) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

Bw3—38 to 46 inches; dark brown (10YR 4/3) silt loam; weak fine prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct dark brown (10YR 3/3) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

Bw4—46 to 55 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; few distinct dark brown (10YR 3/3) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

Bw5—55 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; few very fine roots; slightly acid.

Thickness of the solum ranges from 50 to more than 60 inches. Thickness of the mollic epipedon ranges from 12 to 24 inches. The profile contains 5 to 15 percent fine sand or very fine sand.

The Ap and A horizons have value and chroma of 2 or 3. The Bw horizon has value of 3 to 5.

Ridgeville Series

The Ridgeville series consists of somewhat poorly drained soils on stream terraces and uplands. These soils formed in outwash or eolian deposits. Permeability is moderate in the upper part of the profile and moderately rapid in the lower part. Slope ranges from 0 to 2 percent.

Typical pedon of Ridgeville sandy loam, 165 feet north and 1,184 feet east of the southwest corner of sec. 19, T. 22 N., R. 6 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many very fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; moderately acid; clear smooth boundary.

A—9 to 18 inches; very dark grayish brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; common very fine and fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; moderately acid; gradual smooth boundary.

Bt1—18 to 26 inches; dark grayish brown (10YR 4/2) sandy loam; common fine distinct dark yellowish brown (10YR 4/6) and few fine faint dark grayish brown (2.5Y 4/2) mottles; weak fine and medium subangular blocky structure; friable; common very fine roots; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; moderately acid; clear smooth boundary.

Bt2—26 to 36 inches; dark grayish brown (10YR 4/2) sandy loam; many fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few very fine and fine roots; common distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; strongly acid; clear smooth boundary.

2Cg—36 to 60 inches; light brownish gray (10YR 6/2) sand; common fine prominent dark yellowish brown (10YR 4/6) mottles; single grain; loose; strongly acid.

Thickness of the solum ranges from 35 to 45 inches. The mollic epipedon is 10 to 24 inches thick.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. They are sandy loam, fine sandy loam, loam, or loamy sand. The Bt horizon has value of 4 or 5 and chroma of 2 to 4. It is loam, sandy clay loam, sandy loam, or fine sandy loam. The 2Cg horizon has value of 4 to 6 and chroma of 2 to 6. It is sand or loamy sand.

Riley Series

The Riley series consists of somewhat poorly drained soils on flood plains. These soils formed in alluvium. Permeability is moderate in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 2 percent.

Typical pedon of Riley silt loam, occasionally flooded, 125 feet south and 211 feet west of the northeast corner of sec. 26, T. 20 N., R. 5 W.

Ap—0 to 8 inches; black (10YR 2/1) silt loam, very dark grayish brown (10YR 3/2) dry; weak fine granular structure; friable; few very fine roots; neutral; clear smooth boundary.

A—8 to 11 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure parting to moderate fine granular; friable; few very fine roots; few fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

AB—11 to 15 inches; very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) loam, gray (10YR 5/1) dry; weak very fine and fine subangular blocky structure; friable; few very fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; few fine accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Bw1—15 to 19 inches; dark brown (10YR 4/3) and very dark grayish brown (10YR 3/2) loam; common fine prominent strong brown (7.5YR 4/6) and faint dark grayish brown (10YR 4/2) mottles; weak fine subangular blocky structure; friable; few very fine roots; few fine concretions and accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Bw2—19 to 22 inches; dark brown (10YR 4/3), dark grayish brown (10YR 4/2), and very dark grayish brown (10YR 3/2) loam; common fine prominent strong brown (7.5YR 4/6) mottles; weak fine subangular blocky structure; friable; few very fine roots; common fine concretions and accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Bw3—22 to 26 inches; dark yellowish brown (10YR 4/4), dark grayish brown (10YR 4/2), and dark brown (10YR 4/3) loam; common fine prominent strong brown (7.5YR 4/6) mottles; weak medium subangular blocky structure; friable; few very fine roots; common fine and medium concretions and accumulations of iron and manganese oxide; neutral; clear smooth boundary.

Bw4—26 to 32 inches; yellowish brown (10YR 5/4) loam; common fine prominent strong brown (7.5YR 4/6) and distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; few very fine roots; common fine and medium concretions and accumulations of iron and manganese oxide; neutral; clear smooth boundary.

BC—32 to 35 inches; yellowish brown (10YR 5/4) sandy loam; common medium prominent strong brown (7.5YR 4/6) and few fine distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; few very fine roots; common fine and medium accumulations of iron and manganese oxide; neutral; clear smooth boundary.

2C1—35 to 43 inches; yellowish brown (10YR 5/4) sand; single grain; loose; neutral; clear smooth boundary.

2C2—43 to 60 inches; yellowish brown (10YR 5/4) coarse sand; single grain; loose; about 10 percent fine and medium gravel; neutral.

Thickness of the solum ranges from 25 to 40 inches. Thickness of the mollic epipedon ranges from 10 to 18 inches. The content of organic carbon decreases irregularly with increasing depth. It is more than 0.3 percent in some subhorizons above a depth of 50 inches.

The Ap and A horizons have chroma of 1 or 2. They are loam, clay loam, silt loam, or silty clay loam. The Bw horizon is loam, clay loam, silt loam, or silty clay loam. The 2C horizon is loamy sand, sand, or coarse sand.

Sable Series

The Sable series consists of poorly drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 0 to 2 percent.

Typical pedon of Sable silty clay loam, 1,550 feet north and 420 feet west of the southeast corner of sec. 35, T. 21 N., R. 5 W.

Ap—0 to 9 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; weak fine subangular blocky structure parting to weak fine granular; firm; few very fine and fine roots; neutral; clear smooth boundary.

A—9 to 16 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure; friable; few very fine and fine roots; neutral; gradual smooth boundary.

AB—16 to 22 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; few fine prominent dark grayish brown (2.5Y 4/2) mottles; moderate fine and medium subangular blocky structure; friable; few very fine and fine roots; common faint

black (10YR 2/1) organic coatings on faces of peds; few fine concretions of iron and manganese oxide; neutral; gradual smooth boundary.

Bg—22 to 28 inches; dark gray (5Y 4/1) silty clay loam; common medium prominent grayish brown (2.5Y 5/2) and light olive brown (2.5Y 5/4) mottles; moderate medium subangular blocky structure; friable; few very fine roots; few fine concretions of iron and manganese oxide; black (10YR 2/1) krotovinas; neutral; gradual smooth boundary.

Btg—28 to 46 inches; grayish brown (2.5Y 5/2) silty clay loam; many coarse prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct dark gray (5Y 4/1) clay films on faces of peds and in root channels; few fine concretions of iron and manganese oxide; black (10YR 2/1) krotovinas; neutral; gradual smooth boundary.

Cg—46 to 60 inches; grayish brown (2.5Y 5/2) silt loam; many coarse prominent yellowish brown (10YR 5/6) mottles; massive; friable; few very fine roots; black (10YR 2/1) krotovinas; neutral.

Thickness of the solum ranges from 40 to 55 inches. Thickness of the mollic epipedon ranges from 12 to 24 inches.

The Ap and A horizons have value of 2 or 3. The Bg and Btg horizons have hue of 10YR, 2.5Y, or 5Y and value of 4 to 6.

Sawmill Series

The Sawmill series consists of poorly drained, moderately permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Typical pedon of Sawmill silty clay loam, occasionally flooded, 1,199 feet north and 160 feet west of the southeast corner of sec. 11, T. 19 N., R. 9 W.

Ap—0 to 5 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; firm; few very fine roots; slightly alkaline; clear smooth boundary.

A1—5 to 10 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; friable; few very fine roots; neutral; clear smooth boundary.

A2—10 to 15 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; common fine prominent brown (7.5YR 4/4) mottles; moderate fine subangular blocky structure; friable; few very fine roots; neutral; gradual smooth boundary.

A3—15 to 26 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; common medium prominent brown (7.5YR 4/4) and strong brown (7.5YR 4/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; neutral; gradual smooth boundary.

Bg1—26 to 30 inches; dark gray (10YR 4/1) silty clay loam; common medium prominent strong brown (7.5YR 4/6) mottles; moderate medium subangular blocky structure; friable; few very fine roots; very few faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

Bg2—30 to 39 inches; dark gray (10YR 4/1) silty clay loam; common medium prominent brown (7.5YR 4/4) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; few faint very dark gray (10YR 3/1) organic coatings in root channels; neutral; gradual smooth boundary.

BCg—39 to 48 inches; dark gray (10YR 4/1) silty clay loam; many medium faint gray (10YR 5/1) and common medium prominent brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; friable; few very fine roots; neutral; gradual smooth boundary.

Cg—48 to 60 inches; mottled gray (5Y 5/1 and N 5/0), grayish brown (2.5Y 5/2), and light olive brown (2.5Y 5/4) silty clay loam; massive; friable; few very fine roots; moderately alkaline.

Thickness of the solum ranges from 45 to 60 inches. Thickness of the mollic epipedon ranges from 24 to 36 inches.

The Ap and A horizons have hue of 10YR or are neutral in hue. They have chroma of 0 or 1. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2.

In areas of Sawmill silt loam, overwash, occasionally flooded, recent deposition has buried the original A horizon with 6 to 19 inches of silt loam overwash.

Selma Series

The Selma series consists of poorly drained soils on stream terraces. These soils formed in outwash. Permeability is moderate in the upper part of the profile and moderately rapid in the lower part. Slope ranges from 0 to 2 percent.

Typical pedon of Selma clay loam, 270 feet north and 1,680 feet east of the southwest corner of sec. 22, T. 22 N., R. 6 W.

Ap—0 to 11 inches; black (10YR 2/1) clay loam, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; slightly acid; clear smooth boundary.

A—11 to 20 inches; very dark gray (10YR 3/1) clay loam, dark grayish brown (10YR 4/2) dry; common fine prominent brown (7.5YR 4/4) mottles; weak fine and medium subangular blocky structure; friable; few very fine roots; many faint black (10YR 2/1) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

Bg1—20 to 28 inches; dark grayish brown (2.5Y 4/2) clay loam; many fine prominent yellowish brown (10YR 5/4 and 5/6) mottles; weak medium prismatic structure parting to moderate fine and medium subangular blocky; friable; few very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

Bg2—28 to 39 inches; dark grayish brown (2.5Y 4/2) clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct dark gray (5Y 4/1) coatings and very dark gray (10YR 3/1) organic coatings on faces of peds; black (10YR 2/1) krotovinas; neutral; gradual smooth boundary.

Bg3—39 to 48 inches; gray (5Y 5/1) clay loam; many coarse prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; friable; few very fine roots; few distinct dark gray (5Y 4/1) coatings and very dark gray (10YR 3/1) organic coatings on faces of peds; very dark gray (10YR 3/1) krotovinas; neutral; clear smooth boundary.

Cg—48 to 60 inches; light brownish gray (10YR 6/2) sand and grayish brown (10YR 5/2) sandy loam; massive; very friable; few very fine roots; neutral.

Thickness of the solum ranges from 40 to 55 inches. Thickness of the mollic epipedon ranges from 12 to 24 inches.

The Ap and A horizons are clay loam or loam. The Bg horizon has hue of 10YR, 2.5Y, or 5Y and value of 4 to 6. It is clay loam or loam. The Cg horizon is stratified loam, sandy loam, loamy sand, or sand.

Sparta Series

The Sparta series consists of excessively drained, rapidly permeable soils on stream terraces, dunes, uplands, and flood plains. These soils formed in wind- and water-deposited, sandy material. Slope ranges from 1 to 15 percent.

The Sparta soils in Mason County contain less organic carbon in the surface layer than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soils.

Typical pedon of Sparta loamy sand, 1 to 7 percent slopes, 2,282 feet north and 290 feet west of the southeast corner of sec. 11, T. 19 N., R. 10 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loamy sand, brown (10YR 5/3) dry; weak fine subangular blocky structure parting to weak fine granular; very friable; common fine roots; moderately acid; abrupt smooth boundary.

A—9 to 23 inches; dark brown (10YR 3/3) loamy sand, brown (10YR 5/3) dry; weak medium subangular blocky structure; very friable; few fine roots; common faint very dark grayish brown (10YR 3/2) organic coatings on faces of peds; about 1 percent fine gravel; moderately acid; clear smooth boundary.

Bw1—23 to 29 inches; brown (10YR 4/3) loamy sand; weak medium subangular blocky structure; very friable; few fine roots; common faint dark brown (10YR 3/3) organic coatings on faces of peds; about 1 percent fine gravel; moderately acid; clear smooth boundary.

Bw2—29 to 38 inches; dark yellowish brown (10YR 4/4) sand; weak coarse subangular blocky structure; very friable; few fine roots; about 1 percent fine gravel; moderately acid; gradual smooth boundary.

C1—38 to 45 inches; dark yellowish brown (10YR 4/4 and 4/6) sand; single grain; loose; about 2 percent fine gravel; slightly acid; gradual smooth boundary.

C2—45 to 60 inches; strong brown (7.5YR 4/6) sand; single grain; loose; about 3 percent fine gravel; moderately acid.

Thickness of the solum ranges from 25 to 45 inches. Thickness of the dark surface soil ranges from 10 to 24 inches.

The Ap and A horizons have chroma of 1 to 3. They are loamy sand, sand, loamy fine sand, or fine sand. The Bw horizon has value of 4 or 5 and chroma of 3 to 6. It is loamy sand, sand, loamy fine sand, or fine sand.

Tallula Series

The Tallula series consists of well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 7 to 15 percent.

The Tallula soils in Mason County have a thinner dark surface layer than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soils.

Typical pedon of Tallula silt loam, in an area of Tallula-Bold complex, 7 to 15 percent slopes, eroded, 2,099 feet north and 841 feet west of the southeast corner of sec. 24, T. 20 N., R. 7 W.

Ap—0 to 7 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak medium subangular blocky structure parting to weak fine granular; friable; few very fine roots; neutral; gradual smooth boundary.
Bw1—7 to 11 inches; mixed dark yellowish brown (10YR 4/4) and dark brown (10YR 3/3) silt loam; weak fine and medium subangular blocky structure; friable; few very fine roots; neutral; clear smooth boundary.
Bw2—11 to 21 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; few very fine roots; neutral; gradual smooth boundary.
Bw3—21 to 32 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; very friable; few very fine roots; strong effervescence; moderately alkaline; gradual smooth boundary.
C—32 to 60 inches; yellowish brown (10YR 5/4) silt; massive; very friable; few very fine roots; strong effervescence; moderately alkaline.

Thickness of the solum and depth to free carbonates range from 18 to 35 inches. Thickness of the dark surface layer ranges from 7 to 10 inches.

The Ap or A horizon has chroma of 2 or 3. The C horizon is silt or silt loam.

Tama Series

The Tama series consists of well drained, moderately permeable soils on uplands and stream terraces. These soils formed in loess. Slope ranges from 0 to 10 percent.

Typical pedon of Tama silt loam, 2 to 5 percent slopes, 137 feet south and 439 feet east of the northwest corner of sec. 24, T. 20 N., R. 6 W.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak medium subangular blocky structure parting to weak fine granular; friable; many very fine roots; moderately acid; abrupt smooth boundary.
BA—10 to 16 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine subangular blocky structure; friable; common very fine roots; slightly acid; clear smooth boundary.
Bt1—16 to 22 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine and fine subangular blocky structure; friable; common very fine roots; many distinct dark brown (10YR 4/3 and 3/3) clay films on faces of peds; moderately acid; clear smooth boundary.
Bt2—22 to 29 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; few very fine roots; many distinct dark brown (10YR 4/3 and 3/3) clay films on faces of peds; moderately acid; clear smooth boundary.
Bt3—29 to 38 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; common distinct dark brown (10YR 4/3) clay films on faces of peds; few distinct very dark grayish brown (10YR 3/2) organic coatings in root channels; moderately acid; gradual smooth boundary.
BC—38 to 50 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings in root channels; moderately acid; gradual smooth boundary.
C—50 to 60 inches; dark yellowish brown (10YR 4/6) silt loam; massive; friable; few very fine roots; moderately acid.

Thickness of the solum ranges from 40 to more than 60 inches. Thickness of the mollic epipedon ranges from 10 to 22 inches.

The Ap or A horizon has value and chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 3 or 4.

Tama silt loam, 5 to 10 percent slopes, eroded, has a thinner dark surface layer than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soil.

Thorp Series

The Thorp series consists of poorly drained soils on stream terraces. These soils formed in loess or silty material and in the underlying stratified outwash. Permeability is slow in the upper part of the profile and moderately rapid in the lower part. Slope ranges from 0 to 2 percent.

Typical pedon of Thorp silt loam, 111 feet north and 376 feet east of the southwest corner of sec. 24, T. 21 N., R. 7 W.

Ap—0 to 6 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few very fine roots; moderately acid; clear smooth boundary.
A—6 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; moderately acid; abrupt smooth boundary.

Eg—11 to 16 inches; dark grayish brown (2.5Y 4/2) silt loam, light brownish gray (2.5Y 6/2) dry; common fine distinct brown (10YR 4/3) mottles; weak medium platy structure; friable; few very fine roots; few distinct very dark gray (10YR 3/1) organic coatings and many distinct light gray (10YR 7/1 dry) silt coatings on faces of peds; moderately acid; clear smooth boundary.

Btg1—16 to 21 inches; dark grayish brown (2.5Y 4/2) silty clay loam; many medium faint grayish brown (2.5Y 5/2) and common medium prominent yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few very fine roots; many distinct very dark grayish brown (2.5Y 3/2) clay films and common distinct light gray (10YR 7/1 dry) silt coatings on faces of peds; few fine dark accumulations of iron and manganese oxide; moderately acid; clear smooth boundary.

Btg2—21 to 29 inches; grayish brown (2.5Y 5/2) silty clay loam; many coarse prominent yellowish brown (10YR 5/6) and faint light brownish gray (2.5Y 6/2) mottles; moderate fine and medium subangular and angular blocky structure; firm; few very fine roots; many distinct very dark grayish brown (2.5Y 3/2) and dark grayish brown (2.5Y 4/2) clay films on faces of peds and in root channels; few fine dark accumulations of iron and manganese oxide; moderately acid; clear smooth boundary.

Btg3—29 to 38 inches; light brownish gray (2.5Y 6/2) silty clay loam; many coarse prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak medium and coarse subangular blocky; firm; few very fine roots; few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds and common distinct very dark grayish brown (2.5Y 3/2) clay films in root channels; few fine dark accumulations of iron and manganese oxide; slightly acid; gradual smooth boundary.

Btg4—38 to 49 inches; light brownish gray (2.5Y 6/2) silt loam; many coarse prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; friable; few very fine roots; few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds and common distinct very dark grayish brown (2.5Y 3/2) clay films in root channels; few fine dark accumulations of iron and manganese oxide; slightly acid; abrupt smooth boundary.

2BCg—49 to 53 inches; dark grayish brown (2.5Y 4/2) fine sandy loam and loamy fine sand; weak medium prismatic structure; very friable; common distinct very dark grayish brown (2.5Y 3/2) clay films in pores; neutral; clear smooth boundary.

2Cg—53 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; many coarse prominent yellowish brown (10YR 5/6) mottles; massive; friable; few fine dark accumulations of iron and manganese oxide; few thin strata of loamy fine sand; slight effervescence; moderately alkaline.

Thickness of the solum ranges from 45 to more than 60 inches. Thickness of the loess or silty material ranges from 32 to 54 inches. The mollic epipedon is 10 to 14 inches thick.

The Ap and A horizons have value of 2 or 3. The Eg horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. The Btg horizon has hue of 10YR, 2.5Y, or 5Y and chroma of 1 or 2. The 2Btg or 2BCg horizon is stratified loam, silt loam, fine sandy loam, sandy loam, loamy fine sand, or loamy sand.

Tice Series

The Tice series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Typical pedon of Tice silty clay loam, frequently flooded, 1,740 feet south and 2,190 feet west of the northeast corner of sec. 1, T. 19 N., R. 7 W.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium angular blocky structure; friable; few very fine roots; neutral; clear smooth boundary.

A—9 to 14 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure parting to weak medium granular; friable; few very fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

BA—14 to 19 inches; dark brown (10YR 3/3) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; few very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bw1—19 to 31 inches; dark grayish brown (10YR 4/2) silt loam; common fine distinct dark yellowish brown (10YR 4/4) mottles; weak fine and medium subangular blocky structure; friable; few very fine roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine dark accumulations of iron and manganese oxide; slightly acid; gradual smooth boundary.

Bw2—31 to 44 inches; dark grayish brown (10YR 4/2) silt loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; few very fine

roots; common distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine dark accumulations of iron and manganese oxide; moderately acid; gradual smooth boundary.

Bw3—44 to 60 inches; dark grayish brown (10YR 4/2) silt loam; many medium faint grayish brown (10YR 5/2) and common medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; moderately acid.

Thickness of the solum ranges from 40 to more than 60 inches. Thickness of the mollic epipedon ranges from 10 to 24 inches. The content of organic carbon decreases irregularly with increasing depth. It is more than 0.3 percent in some subhorizons above a depth of 50 inches. The profile contains 5 to 15 percent fine sand or very fine sand.

The Ap and A horizons have value of 2 or 3. They are silty clay loam or silt loam. The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is silty clay loam or silt loam.

Timula Series

The Timula series consists of well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 10 to 18 percent.

Typical pedon of Timula silt loam, 10 to 18 percent slopes, eroded, 1,530 feet north and 540 feet east of the southwest corner of sec. 25, T. 20 N., R. 6 W.

Ap—0 to 5 inches; mixed dark brown (10YR 4/3) and dark yellowish brown (10YR 4/4) silt loam, yellowish brown (10YR 5/4) dry; weak fine granular structure; friable; many very fine roots; slightly acid; clear smooth boundary.

Bw—5 to 15 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine and medium subangular blocky structure; friable; few very fine roots; slightly acid; clear smooth boundary.

BC—15 to 22 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; few very fine roots; moderately alkaline; clear smooth boundary.

C1—22 to 36 inches; yellowish brown (10YR 5/4) silt loam; massive; friable; few very fine roots; very slight effervescence; moderately alkaline; gradual smooth boundary.

C2—36 to 60 inches; light yellowish brown (10YR 6/4), laminated silt; many fine and medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few very fine roots; common accumulations of iron and manganese oxide; slight effervescence; moderately alkaline.

Thickness of the solum and depth to free carbonates range from 18 to 36 inches.

The Ap or A horizon has value of 3 or 4 and chroma of 2 to 4. The Bw horizon has value of 4 or 5 and chroma of 4 to 6. The C horizon is silt or silt loam.

Udolpho Series

The Udolpho series consists of poorly drained soils on stream terraces. These soils formed in outwash underlain by sandy deposits. Permeability is moderate in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 2 percent.

Typical pedon of Udolpho fine sandy loam, 440 feet north and 131 feet east of the southwest corner of sec. 31, T. 21 N., R. 7 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; few very fine roots; moderately acid; abrupt smooth boundary.

Eg—9 to 14 inches; grayish brown (10YR 5/2) fine sandy loam, light gray (10YR 7/2) dry; weak medium platy structure; friable; few very fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings and many distinct light gray (10YR 7/1 dry) silt coatings on faces of peds; moderately acid; abrupt smooth boundary.

Btg1—14 to 27 inches; grayish brown (2.5Y 5/2) sandy clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few very fine roots; many distinct dark grayish brown (2.5Y 4/2) clay films and common distinct light gray (10YR 7/1 dry) silt coatings on faces of peds; strongly acid; clear smooth boundary.

Btg2—27 to 31 inches; light brownish gray (2.5Y 6/2) fine sandy loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common distinct grayish brown (2.5Y 5/2) clay films and light gray (10YR 7/1 dry) silt coatings on faces of peds; slightly acid; abrupt smooth boundary.

2Cg1—31 to 45 inches; mottled light gray (10YR 7/2) and yellowish brown (10YR 5/6) fine sand; single grain; loose; slightly acid; clear smooth boundary.

2Cg2—45 to 60 inches; grayish brown (10YR 5/2) loamy sand and sand; common medium prominent strong brown (7.5YR 4/6) mottles; single grain; loose; slightly acid.

Thickness of the solum and depth to the sandy material range from 25 to 40 inches. Thickness of the

dark surface layer ranges from 6 to 10 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. It is fine sandy loam, sandy loam, or loam. The Eg horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. It is loamy sand, loamy fine sand, sandy loam, fine sandy loam, or loam. The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. It is clay loam, loam, sandy clay loam, or fine sandy loam. The 2Cg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 6.

Watseka Series

The Watseka series consists of somewhat poorly drained, rapidly permeable soils on stream terraces. These soils formed in wind- and water-deposited, sandy material. Slope ranges from 0 to 2 percent.

Typical pedon of Watseka loamy sand, 1,423 feet north and 716 feet east of the southwest corner of sec. 23, T. 21 N., R. 8 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) loamy sand, grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; few very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

A—8 to 16 inches; very dark grayish brown (10YR 3/2) loamy sand, grayish brown (10YR 5/2) dry; weak fine and medium subangular blocky structure; very friable; few very fine roots; many faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

BA—16 to 22 inches; dark grayish brown (10YR 4/2) loamy sand; weak medium subangular blocky structure; very friable; few very fine roots; few animal burrows filled with very dark grayish brown (10YR 3/2) material; moderately acid; clear smooth boundary.

Bw1—22 to 27 inches; grayish brown (10YR 5/2) loamy sand; many medium faint dark grayish brown (10YR 4/2) mottles; weak medium subangular blocky structure; very friable; few very fine roots; moderately acid; gradual smooth boundary.

Bw2—27 to 32 inches; light brownish gray (10YR 6/2) loamy sand; common medium faint grayish brown (10YR 5/2) and few medium distinct brown (10YR 5/3) mottles; weak medium subangular blocky structure; very friable; few very fine roots; moderately acid; gradual smooth boundary.

BC—32 to 40 inches; light brownish gray (10YR 6/2) sand; few medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; very friable; few very fine roots; moderately acid; gradual smooth boundary.

C—40 to 60 inches; brown (10YR 5/3) sand; few medium faint yellowish brown (10YR 5/4) mottles; single grain; loose; moderately acid.

Thickness of the solum ranges from 24 to 40 inches. The mollic epipedon is 10 to 20 inches thick.

The Ap and A horizons have chroma of 1 or 2. They are loamy sand or sand. The Bw horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 or 3. It is loamy sand or sand.

Worthen Series

The Worthen series consists of well drained, moderately permeable soils on stream terraces. These soils formed in alluvium. Slope ranges from 0 to 2 percent.

Typical pedon of Worthen silt loam, 2,234 feet south and 1,842 feet west of the northeast corner of sec. 33, T. 20 N., R. 6 W.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak fine granular structure; friable; few very fine roots; moderately acid; clear smooth boundary.

A—7 to 16 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak fine subangular blocky structure; friable; few very fine roots; moderately acid; clear smooth boundary.

AB—16 to 26 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine and medium subangular blocky structure; friable; few very fine roots; moderately acid; clear smooth boundary.

Bw1—26 to 34 inches; dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; weak fine and medium subangular blocky structure; friable; few very fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately acid; gradual smooth boundary.

Bw2—34 to 40 inches; brown (10YR 4/3) silt loam; weak fine and medium subangular blocky structure; friable; few very fine roots; common distinct dark brown (10YR 3/3) organic coatings on faces of peds; moderately acid; gradual smooth boundary.

Bw3—40 to 49 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; few very fine roots; few distinct dark brown (10YR 3/3) organic coatings on faces of peds; moderately acid; gradual smooth boundary.

Bw4—49 to 60 inches; brown (10YR 4/3) silt loam; weak medium and coarse subangular blocky structure; friable; common distinct dark brown (10YR 3/3) organic coatings and few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds; slightly acid.

Thickness of the solum ranges from 48 to more than 60 inches. Thickness of the mollic epipedon ranges from 24 to 36 inches. The profile contains 5 to 15 percent fine sand or very fine sand.

The Ap and A horizons have value of 2 or 3 and chroma of 1 to 3. The Bw horizon has chroma of 3 or 4.

Formation of the Soils

Soil forms through several processes that act on deposited geologic material. The major factors of soil formation are the physical and mineralogical composition of the parent material; the climate under which the soil material has accumulated and existed since accumulation; the type of plant and animal life on and in the soil; relief; and the length of time that the soil-forming factors have acted on the parent material *(3)*.

Climate and plant and animal life are active factors of soil formation. They act directly on the parent material that has accumulated in place through the weathering of rocks or that was deposited through the action of water, wind, or glaciers and slowly change it into a natural body that has genetically related horizons. Relief also affects the processes of soil formation. It can inhibit soil formation on the steeper, eroded slopes and in wet, depressional or nearly level areas by controlling the amount of moisture in the soils. Finally, time is needed to change the parent material into a soil that has distinct horizons.

The factors of soil formation are so closely interrelated and conditioned by each other that few generalizations can be made regarding the effects of any one factor unless conditions are specified for the others.

Parent Material

Parent material is the geologic material in which a soil forms. The three major kinds of parent material in Mason County are glacial outwash, loess, and alluvium. Some deposits of organic material are northeast of Manito and in areas along Quiver Creek, but they are of minor importance. Although the major parent materials are of glacial origin, their properties vary greatly, depending on the method of deposition.

Glacial outwash is material that was deposited by glacial meltwater. The particle size of the material varies, depending on the velocity of the stream that carried the material. The coarser particles were deposited as the water began to slow down, and the finer particles were carried a greater distance and were deposited by more slowly moving water. Outwash deposits in Mason County are along the Illinois River valley stream terrace, west of the uplands, on a line running southwest from San Jose through Teheran to the Sangamon River.

The outwash soils in the county range in texture from sand to silty clay loam. Marshan and Onarga soils formed in loamy glacial outwash. In many areas outwash soils, such as Sparta and Watseka soils, are layers of sand. In some areas the outwash has been covered by loess. Plano and Proctor soils formed in loess and in the underlying outwash.

Some of the outwash was reworked and translocated by wind after the initial deposition. The coarser textured material, mainly sand, formed into dunes. In some instances, wind action was strong enough to move sand into upland areas. Plainfield and Bloomfield soils formed in sandy windblown material. They are in extensive areas on stream terraces and in scattered areas throughout the uplands.

Loess was deposited directly by the wind. The primary sources of the loess were the flood plains along the Mississippi and Illinois Rivers. In Mason County the loess ranges from 5 to more than 25 feet in thickness. It is thickest in the southeast and thinner in the northwest *(14)*. In the northwestern part of the uplands, the loess overlies sandy eolian deposits. Pillot soils formed in loess underlain by sand. Ipava and Tama soils, however, formed entirely in loess. They occur in the southeastern part of the uplands.

Alluvium is material that was recently deposited on flood plains by streams. The material varies in texture, depending on the velocity of the floodwater. Most of the alluvial soils in Mason County are on the flood plains along the Illinois and Sangamon Rivers. Examples are Ambraw, Beaucoup, Sawmill, and Tice soils.

Climate

Mason County has a temperate, humid continental climate. Although climate has had an important overall influence on the characteristics of the soils, it is essentially uniform throughout the county and has not

caused any major differences among the soils.

Climate has a very important effect on weathering, vegetation, and erosion. The weathering of minerals in the soil increases as temperature and rainfall increase. As water moves downward, clay is moved from the surface soil to the subsoil, where it accumulates. The water also dissolves soluble salts and leaches them downward. Climate determines the kind and extent of plant and animal life on and in the soil. The climate in Mason County has favored prairie grasses and hardwood forests. Heavy rains can harm exposed soils that are used for crops. Spring rains and wind can cause extensive erosion of the surface if crop residue and trees are removed. More soil can be lost through erosion each year than is formed by natural processes.

Plant and Animal Life

Soils are affected by the vegetation under which they formed. The main contribution of plants and animals to soil formation is the addition of organic material and nitrogen to the soil. The amount of organic material in the soil depends on the kind of plants that grew on the soil. Grasses have many fine fibrous roots that add large amounts of organic matter to the soil when they decay. Soils that formed under prairie vegetation, therefore, have a thick, black or dark brown surface layer. Broadwell, Ipava, Lawndale, and Tama soils formed under prairie vegetation. Soils that formed under deciduous trees have a thin, light-colored surface layer because less organic matter was added to the soil than in areas of prairie vegetation. Alvin, Bloomfield, and Fayette soils formed under forest vegetation.

Bacteria, fungi, and other micro-organisms help to break down the organic matter and thus provide nutrients for plants and other soil organisms. The stability of soil aggregates is affected by microbial activity. Cellular excretions from these organisms help to bind soil particles together. Stable aggregates help to maintain soil porosity and a favorable water-air relationship in the soil. Earthworms, crayfish, insects, and burrowing animals incorporate organic matter into the soil and help to maintain porosity.

Relief

Relief has markedly affected the soils in Mason County through its influence on natural drainage, runoff, erosion, plant cover, and soil temperature. Slopes in the county range from 0 to 60 percent. Natural drainage ranges from excessively drained on side slopes and ridges to very poorly drained in depressions.

Relief influences the depth to the water table and the natural drainage of a soil by affecting the amount of water infiltration and runoff. In nearly level, poorly drained soils, such as Harpster and Selma soils, the water table is close to the surface for most of the year. The soil pores contain water, which restricts the circulation of air in the soil. Under these conditions, iron and manganese compounds are chemically reduced. As a result, the subsoil is dull gray and mottled. In areas of the more sloping, well drained Pillot soils, however, the water table is lower and some of the rainfall runs off the surface. The soil pores contain less water and more air. The iron and manganese compounds are well oxidized. As a result, the subsoil is brown and brightly colored.

Nearly level, poorly drained soils, such as Sable soils, are less well developed than the gently sloping, well drained Tama soils. Sable soils have a high water table for part of the year. The wetness inhibits the removal of weathered material. In contrast, Tama soils are deeper to a water table. As a result, weathered material is translocated downward to a greater extent than in the Sable soils.

Local relief also influences the severity of erosion. Some erosion occurs on all sloping soils, but the hazard of erosion increases as the slope and the runoff rate increase.

Time

The length of time needed for the formation of a soil depends on the other factors of soil formation. Soils form more rapidly and are more acid if the content of lime in the parent material is low. Soil formation proceeds at a faster rate in rapidly permeable material than in slowly permeable material because lime and other soluble minerals are leached more quickly. Forest soils form more quickly than prairie soils because grasses are more efficient than trees in recycling calcium and other bases from the subsoil to the surface layer. Soils in a humid climate that supports good growth of vegetation develop more rapidly than those in a dry climate.

The length of time that the parent material has been in place determines, to a great extent, the degree of profile development. Arenzville and Dockery soils are on flood plains. They have a very weakly developed profile because they periodically receive new alluvial sediments. Although the parent material of the Tice soils is similar to that of the Arenzville and Dockery soils, the sediments are deposited slowly enough to allow stronger profile development. Broadwell and Lawndale soils show intermediate profile development. They are in relatively stable upland areas where the parent material has been in place for a long time. On

the more sloping parts of the landscape, erosion can remove the surface soil material at about the same rate as the rate of soil formation. Thus, soils in these areas, such as Bold, Tallula, and Timula soils, have weak profile development even though the slopes have been exposed to weathering for thousands of years.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Chiseling. Tillage with an implement having one or

more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons.

Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Sprinkler.—Water is sprayed over the surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10

square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of

soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of

consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). A layer of otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-80 at Peoria, Illinois)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	29.7	13.3	21.5	59	-16	0	1.60	0.68	2.38	3	6.2
February----	35.2	18.4	26.8	63	-11	1	1.41	0.76	1.98	3	6.0
March-------	46.5	28.1	37.3	77	3	22	2.86	1.47	4.07	6	4.8
April-------	61.8	40.6	51.2	85	22	139	3.81	2.29	5.17	7	0.9
May---------	72.5	50.6	61.5	91	32	369	3.83	2.23	5.26	6	.0
June--------	82.1	60.2	71.2	96	44	635	3.88	1.87	5.61	6	.0
July--------	85.5	64.6	75.0	98	49	776	3.99	2.43	5.40	5	.0
August------	83.4	62.8	73.1	96	47	715	3.39	1.65	4.89	5	.0
September---	76.7	54.5	65.6	94	36	469	3.63	1.19	5.63	5	.0
October-----	64.8	42.9	53.8	86	23	188	2.51	.96	3.81	4	.0
November----	48.5	30.9	39.7	74	8	30	1.96	1.12	2.70	4	2.2
December----	35.4	20.2	27.8	63	-11	2	2.01	.93	2.94	4	4.5
Yearly:											
Average---	60.2	40.6	50.4	---	---	---	---	---	---	---	---
Extreme---	102	-25	---	99	-17	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,345	34.88	29.45	40.09	58	24.6

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-80 at Peoria, Illinois)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 9	Apr. 22	May 7
2 years in 10 later than--	Apr. 5	Apr. 17	May 2
5 years in 10 later than--	Mar. 29	Apr. 8	Apr. 23
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 24	Oct. 13	Oct. 5
2 years in 10 earlier than--	Oct. 28	Oct. 17	Oct. 10
5 years in 10 earlier than--	Nov. 6	Oct. 27	Oct. 20

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-80 at Peoria, Illinois)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	194	179	160
8 years in 10	200	186	166
5 years in 10	213	198	178
2 years in 10	225	211	191
1 year in 10	232	218	197

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
30G	Hamburg silt loam, 20 to 60 percent slopes	708	0.2
36A	Tama silt loam, 0 to 2 percent slopes	3,018	0.8
36B	Tama silt loam, 2 to 5 percent slopes	6,660	1.8
36C2	Tama silt loam, 5 to 10 percent slopes, eroded	1,959	0.5
37	Worthen silt loam	375	0.1
43	Ipava silt loam	3,144	0.9
49	Watseka loamy sand	3,250	0.9
53B	Bloomfield sand, 1 to 7 percent slopes	19,586	5.4
53D	Bloomfield sand, 7 to 15 percent slopes	2,836	0.8
54B	Plainfield sand, 1 to 7 percent slopes	28,715	8.0
54D	Plainfield sand, 7 to 15 percent slopes	12,368	3.4
54E	Plainfield sand, 15 to 30 percent slopes	1,956	0.5
67	Harpster silty clay loam	7,170	2.0
68	Sable silty clay loam	1,493	0.4
88B	Sparta loamy sand, 1 to 7 percent slopes	19,559	5.4
88D	Sparta loamy sand, 7 to 15 percent slopes	1,743	0.5
89	Maumee loamy sand	1,064	0.3
98B	Ade loamy fine sand, 1 to 7 percent slopes	11,730	3.3
100	Palms muck	745	0.2
103	Houghton muck	301	0.1
125	Selma clay loam	8,040	2.2
131A	Alvin fine sandy loam, 0 to 2 percent slopes	2,485	0.7
131B	Alvin fine sandy loam, 2 to 5 percent slopes	1,924	0.5
131C2	Alvin fine sandy loam, 5 to 10 percent slopes, eroded	1,754	0.5
131D2	Alvin fine sandy loam, 10 to 18 percent slopes, eroded	1,162	0.3
131F	Alvin fine sandy loam, 18 to 30 percent slopes	470	0.1
150A	Onarga sandy loam, 0 to 2 percent slopes	15,917	4.4
150B	Onarga sandy loam, 2 to 5 percent slopes	7,528	2.1
150C2	Onarga fine sandy loam, 5 to 10 percent slopes, eroded	2,579	0.7
151	Ridgeville sandy loam	12,425	3.5
152	Drummer silty clay loam	5,095	1.4
153	Pella silty clay loam	1,286	0.4
159A	Pillot silt loam, 0 to 2 percent slopes	1,134	0.3
159B	Pillot silt loam, 2 to 5 percent slopes	3,045	0.8
159C2	Pillot silt loam, 5 to 10 percent slopes, eroded	1,912	0.5
198	Elburn silt loam	4,964	1.4
199A	Plano silt loam, 0 to 2 percent slopes	2,898	0.8
199B	Plano silt loam, 2 to 5 percent slopes	561	0.2
200	Orio loam	2,035	0.6
201	Gilford sandy loam	6,939	1.9
206	Thorp silt loam	3,626	1.0
244	Hartsburg silty clay loam	619	0.2
266	Disco sandy loam	9,811	2.7
271D2	Timula silt loam, 10 to 18 percent slopes, eroded	401	0.1
272	Edgington silt loam	7,890	2.2
280B	Fayette silt loam, 1 to 5 percent slopes	970	0.3
280C2	Fayette silt loam, 5 to 10 percent slopes, eroded	1,264	0.4
280D2	Fayette silt loam, 10 to 18 percent slopes, eroded	835	0.2
280D3	Fayette silty clay loam, 7 to 15 percent slopes, severely eroded	343	0.1
280F	Fayette silt loam, 18 to 30 percent slopes	886	0.2
374	Proctor silt loam, sandy substratum	809	0.2
379A	Dakota fine sandy loam, 0 to 2 percent slopes	10,769	3.0
379B	Dakota fine sandy loam, 2 to 5 percent slopes	1,434	0.4
430B	Raddle silt loam, 2 to 5 percent slopes	373	0.1
447	Canisteo loam, sandy substratum	4,563	1.3
683	Lawndale silt loam	2,551	0.7
684A	Broadwell silt loam, 0 to 2 percent slopes	2,818	0.8
684B	Broadwell silt loam, 2 to 5 percent slopes	6,771	1.9
684C2	Broadwell silt loam, 5 to 10 percent slopes, eroded	2,142	0.6
685C2	Middletown silt loam, 5 to 10 percent slopes, eroded	456	0.1
770	Udolpho fine sandy loam	13,744	3.8
772	Marshan loam	13,892	3.9
965D2	Tallula-Bold complex, 7 to 15 percent slopes, eroded	943	0.3
1070	Beaucoup silty clay loam, wet	5,059	1.4
1166	Cohoctah loam, wet	2,787	0.8

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
1201	Gilford sandy loam, wet	404	0.1
3088B	Sparta loamy sand, 1 to 5 percent slopes, frequently flooded	403	0.1
3107	Sawmill silty clay loam, frequently flooded	3,331	0.9
3107+	Sawmill silt loam, overwash, frequently flooded	521	0.1
3115	Dockery silty clay loam, frequently flooded	8,724	2.4
3284	Tice silty clay loam, frequently flooded	1,477	0.4
3302	Ambraw clay loam, frequently flooded	979	0.3
3304	Landes sandy loam, frequently flooded	832	0.2
3682	Medway silty clay loam, frequently flooded	2,006	0.6
8070	Beaucoup silty clay loam, occasionally flooded	4,443	1.2
8078	Arenzville silt loam, occasionally flooded	859	0.2
8088B	Sparta loamy fine sand, 1 to 5 percent slopes, occasionally flooded	255	0.1
8107	Sawmill silty clay loam, occasionally flooded	4,061	1.1
8107+	Sawmill silt loam, overwash, occasionally flooded	693	0.2
8284	Tice silty clay loam, occasionally flooded	1,303	0.4
8302	Ambraw clay loam, occasionally flooded	1,915	0.5
8304	Landes fine sandy loam, occasionally flooded	290	0.1
8400	Calco silt loam, occasionally flooded	380	0.1
8452	Riley silt loam, occasionally flooded	1,032	0.3
	Water	18,313	5.2
	Total	360,510	100.0

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
36A	Tama silt loam, 0 to 2 percent slopes
36B	Tama silt loam, 2 to 5 percent slopes
37	Worthen silt loam
43	Ipava silt loam
67	Harpster silty clay loam (where drained)
68	Sable silty clay loam (where drained)
125	Selma clay loam (where drained)
131A	Alvin fine sandy loam, 0 to 2 percent slopes
131B	Alvin fine sandy loam, 2 to 5 percent slopes
131C2	Alvin fine sandy loam, 5 to 10 percent slopes, eroded
150A	Onarga sandy loam, 0 to 2 percent slopes
150B	Onarga sandy loam, 2 to 5 percent slopes
150C2	Onarga fine sandy loam, 5 to 10 percent slopes, eroded
151	Ridgeville sandy loam
152	Drummer silty clay loam (where drained)
153	Pella silty clay loam (where drained)
159A	Pillot silt loam, 0 to 2 percent slopes
159B	Pillot silt loam, 2 to 5 percent slopes
198	Elburn silt loam
199A	Plano silt loam, 0 to 2 percent slopes
199B	Plano silt loam, 2 to 5 percent slopes
200	Orio loam (where drained)
201	Gilford sandy loam (where drained)
206	Thorp silt loam (where drained)
244	Hartsburg silty clay loam (where drained)
266	Disco sandy loam
272	Edgington silt loam (where drained)
280B	Fayette silt loam, 1 to 5 percent slopes
374	Proctor silt loam, sandy substratum
379A	Dakota fine sandy loam, 0 to 2 percent slopes
379B	Dakota fine sandy loam, 2 to 5 percent slopes
430B	Raddle silt loam, 2 to 5 percent slopes
447	Canisteo loam, sandy substratum (where drained)
683	Lawndale silt loam
684A	Broadwell silt loam, 0 to 2 percent slopes
684B	Broadwell silt loam, 2 to 5 percent slopes
770	Udolpho fine sandy loam (where drained)
772	Marshan loam (where drained)
3107	Sawmill silty clay loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3107+	Sawmill silt loam, overwash, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3115	Dockery silty clay loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3284	Tice silty clay loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3302	Ambraw clay loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
3304	Landes sandy loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
3682	Medway silty clay loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
8070	Beaucoup silty clay loam, occasionally flooded (where drained)
8078	Arenzville silt loam, occasionally flooded
8107	Sawmill silty clay loam, occasionally flooded (where drained)
8107+	Sawmill silt loam, overwash, occasionally flooded (where drained)
8284	Tice silty clay loam, occasionally flooded
8302	Ambraw clay loam, occasionally flooded (where drained)
8304	Landes fine sandy loam, occasionally flooded
8400	Calco silt loam, occasionally flooded (where drained)

TABLE 5.--PRIME FARMLAND--Continued

Map symbol	Soil name
8452	Riley silt loam, occasionally flooded (where protected from flooding or not frequently flooded during the growing season)

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
30G-------------- Hamburg	VIIe	---	---	---	---	---	---
36A-------------- Tama	I	170	57	---	102	---	11.9
36B-------------- Tama	IIe	167	56	---	100	---	11.7
36C2------------- Tama	IIIe	162	54	---	97	---	11.4
37--------------- Worthen	I	151	46	62	88	5.9	9.8
43--------------- Ipava	I	163	52	66	91	---	---
49--------------- Watseka	IIIs	92	31	43	62	3.7	6.2
53B-------------- Bloomfield	IIIs	79	31	41	51	3.2	5.3
53D-------------- Bloomfield	IVe	73	29	38	47	2.9	4.8
54B, 54D--------- Plainfield	VIs	---	---	---	35	---	---
54E-------------- Plainfield	VIIs	---	---	---	---	---	---
67--------------- Harpster	IIw	136	44	52	74	---	---
68--------------- Sable	IIw	156	51	61	85	---	---
88B-------------- Sparta	IVs	50	23	---	47	---	---
88D-------------- Sparta	VIs	---	---	---	42	---	---
89--------------- Maumee	IIIw	110	38	50	---	---	---
98B-------------- Ade	IIIs	75	26	34	---	2.5	---
100-------------- Palms	IIIw	118	42	---	65	---	---
103-------------- Houghton	IIIw	118	34	---	---	---	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
125------------- Selma	IIw	136	44	53	76	---	---
131A------------ Alvin	IIs	98	33	48	---	4.3	7.2
131B------------ Alvin	IIe	97	33	48	---	4.3	7.1
131C2, 131D2---- Alvin	IIIe	90	30	44	---	4.0	6.6
131F------------ Alvin	VIe	---	---	---	---	3.1	5.3
150A------------ Onarga	IIs	110	36	48	74	---	7.0
150B------------ Onarga	IIe	108	36	48	73	---	7.0
150C2----------- Onarga	IIIe	103	32	45	69	---	6.6
151------------- Ridgeville	IIs	115	40	53	75	---	7.7
152------------- Drummer	IIw	154	51	61	83	---	9.2
153------------- Pella	IIw	140	48	56	78	---	---
159A------------ Pillot	IIs	112	36	49	75	4.3	7.2
159B------------ Pillot	IIe	111	36	49	74	4.3	7.1
159C2----------- Pillot	IIIe	102	32	44	67	3.9	6.5
198------------- Elburn	I	161	50	63	94	6.1	10.2
199A------------ Plano	I	151	45	60	90	---	9.7
199B------------ Plano	IIe	150	45	59	89	---	9.6
200------------- Orio	IIw	112	37	47	64	---	6.8
201------------- Gilford	IIw	120	42	54	100	---	---
206------------- Thorp	IIw	110	38	44	63	4.2	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
244------------- Hartsburg	IIw	145	47	56	79	---	---
266------------- Disco	IIIs	103	35	44	65	---	6.7
271D2----------- Timula	IIIe	89	30	---	54	3.6	6.0
272------------- Edgington	IIw	122	42	51	68	---	---
280B------------ Fayette	IIe	149	50	---	89	---	10.5
280C2----------- Fayette	IIIe	144	48	---	86	---	10.1
280D2----------- Fayette	IVe	123	40	---	71	---	8.3
280D3----------- Fayette	IVe	118	41	---	74	---	8.6
280F------------ Fayette	VIe	---	---	---	---	---	7.6
374------------- Proctor	I	144	44	59	88	---	9.2
379A------------ Dakota	IIs	90	32	---	70	---	---
379B------------ Dakota	IIe	85	30	---	65	---	---
430B------------ Raddle	IIe	148	45	58	82	5.7	9.6
447------------- Canisteo	IIw	132	44	53	77	---	---
683------------- Lawndale	I	156	50	62	87	---	9.7
684A------------ Broadwell	I	145	44	59	84	---	9.3
684B------------ Broadwell	IIe	144	44	58	83	---	9.2
684C2----------- Broadwell	IIIe	136	41	55	79	---	8.7
685C2----------- Middletown	IIIe	110	32	50	66	---	7.3
770------------- Udolpho	IIw	110	35	---	77	---	5.0

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
772------------- Marshan	IIw	95	35	---	70	---	---
965D2----------- Tallula-Bold	IIIe	86	29	40	54	---	6.3
1070------------ Beaucoup	Vw	---	---	---	---	---	---
1166------------ Cohoctah	Vw	---	---	---	---	---	---
1201------------ Gilford	Vw	---	---	---	---	---	---
3088B----------- Sparta	IVs	50	23	---	47	---	---
3107, 3107+----- Sawmill	IIIw	132	42	---	---	---	---
3115------------ Dockery	IVw	---	22	---	---	---	---
3284------------ Tice	IIIw	110	34	---	---	4.1	6.9
3302------------ Ambraw	IVw	100	30	---	---	---	---
3304------------ Landes	IIIw	67	23	---	41	---	4.1
3682------------ Medway	IIw	100	35	---	---	4.0	---
8070------------ Beaucoup	IIw	138	44	52	---	---	---
8078------------ Arenzville	IIw	120	40	---	80	---	---
8088B----------- Sparta	IVs	50	23	---	47	---	---
8107, 8107+----- Sawmill	IIw	147	47	54	76	---	---
8284------------ Tice	IIw	130	40	---	---	4.8	8.1
8302------------ Ambraw	IIw	110	36	42	61	---	---
8304------------ Landes	IIw	75	26	34	47	---	4.7
8400------------ Calco	IIw	130	44	---	72	---	6.5

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
8452------------- Riley	IIw	122	41	55	75	4.7	---

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
30G------------- Hamburg	2R	Severe	Severe	Severe	Slight	White oak-----------	45	30	Bur oak, eastern redcedar, white oak.
						Bur oak-------------	---	---	
						Eastern redcedar----	---	---	
						Post oak------------	---	---	
						Black oak-----------	---	---	
53B, 53D-------- Bloomfield	4S	Slight	Slight	Moderate	Slight	Black oak-----------	70	52	Eastern white pine, Scotch pine, red pine, eastern redcedar, jack pine.
						White oak-----------	---	---	
						Scarlet oak---------	---	---	
						Shagbark hickory----	---	---	
54B, 54D-------- Plainfield	4S	Slight	Moderate	Moderate	Slight	Black oak-----------	70	52	Red pine, eastern white pine, jack pine.
						White oak-----------	55	43	
						Black cherry--------	---	---	
						Scarlet oak---------	---	58	
						Northern red oak----	---	---	
54E------------- Plainfield	4R	Moderate	Moderate	Moderate	Slight	Black oak-----------	70	52	Red pine, eastern white pine, jack pine.
						White oak-----------	55	43	
						Black cherry--------	---	---	
						Scarlet oak---------	---	58	
						Northern red oak----	---	---	
88B, 88D-------- Sparta	4S	Slight	Slight	Severe	Slight	Northern red oak----	70	52	Red pine, eastern white pine, jack pine.
						Eastern white pine--	---	---	
						Red pine------------	---	---	
						Jack pine-----------	---	---	
89-------------- Maumee	4W	Slight	Severe	Slight	Severe	Pin oak-------------	70	52	Eastern white pine, European larch, Norway spruce, white spruce.
						Eastern white pine--	55	106	
						Bigtooth aspen------	70	82	
						Silver maple--------	---	---	
100------------- Palms	2W	Slight	Severe	Severe	Severe	White ash-----------	51	35	---
						Red maple-----------	51	33	
						Quaking aspen-------	56	56	
						Black willow--------	---	---	
						Silver maple--------	76	30	
103------------- Houghton	2W	Slight	Severe	Severe	Severe	White ash-----------	51	35	---
						Red maple-----------	51	33	
						Black willow--------	---	---	
						Quaking aspen-------	56	56	
						Silver maple--------	76	30	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
131A, 131B, 131C2, 131D2---Alvin	4A	Slight	Slight	Slight	Slight	White oak-----------	80	62	Green ash, black walnut, yellow-poplar, white oak, eastern white pine, American sycamore, sugar maple.
						Northern red oak----	80	62	
						Black walnut--------	---	---	
						Yellow-poplar-------	90	90	
131F------------Alvin	4R	Moderate	Moderate	Slight	Slight	White oak-----------	80	62	Green ash, black walnut, yellow-poplar, white oak, eastern white pine, American sycamore, sugar maple.
						Northern red oak----	80	62	
						Black walnut--------	---	---	
						Yellow-poplar-------	90	90	
201-------------Gilford	4W	Slight	Severe	Severe	Severe	Pin oak-------------	70	52	Eastern white pine, European larch, white spruce, white ash.
						Eastern white pine--	55	106	
						Bigtooth aspen------	70	82	
						Red maple-----------	60	38	
271D2-----------Timula	4A	Slight	Slight	Slight	Slight	White oak-----------	70	52	Eastern white pine, red pine, Scotch pine, white oak.
						Northern red oak----	---	---	
						Green ash-----------	---	---	
						Bur oak-------------	---	---	
280B, 280C2, 280D2, 280D3---Fayette	4A	Slight	Slight	Slight	Slight	White oak-----------	80	62	Eastern white pine, northern red oak, green ash, yellow-poplar.
						Northern red oak----	80	62	
						Yellow-poplar-------	90	90	
						Black walnut--------	---	---	
280F------------Fayette	4R	Moderate	Moderate	Slight	Slight	White oak-----------	80	62	Eastern white pine, northern red oak, green ash, yellow-poplar.
						Northern red oak----	80	62	
						Yellow-poplar-------	90	90	
						Black walnut--------	---	---	
685C2-----------Middletown	4A	Slight	Slight	Slight	Slight	White oak-----------	80	62	White oak, northern red oak, black walnut, green ash, sugar maple, eastern white pine, red pine, Scotch pine.
						Northern red oak----	80	62	
						Black walnut--------	---	---	
770-------------Udolpho	7W	Slight	Moderate	Moderate	Moderate	Eastern cottonwood--	90	103	Eastern cottonwood.
						Green ash-----------	50	34	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
1070------------ Beaucoup	5W	Slight	Severe	Moderate	Moderate	Pin oak-------------	90	72	Eastern cottonwood, red maple, American sycamore, sweetgum, pin oak.
						Eastern cottonwood--	100	128	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
1166------------ Cohoctah	3W	Slight	Severe	Moderate	Moderate	Red maple-----------	72	44	Eastern cottonwood, pin oak, green ash, red maple, American sycamore, swamp white oak.
						Silver maple--------	95	46	
						Pin oak-------------	---	---	
						Green ash-----------	70	66	
						Eastern cottonwood--	---	---	
						Black cherry--------	---	---	
						Swamp white oak-----	---	---	
1201------------ Gilford	4W	Slight	Severe	Severe	Severe	Pin oak-------------	70	52	Eastern white pine, European larch, white spruce, white ash.
						Eastern white pine--	55	106	
						Bigtooth aspen------	70	82	
						Red maple-----------	60	38	
3088B----------- Sparta	4S	Slight	Slight	Severe	Slight	Northern red oak----	70	52	Red pine, eastern white pine, jack pine.
						Eastern white pine--	---	---	
						Red pine------------	---	---	
						Jack pine-----------	---	---	
3107, 3107+----- Sawmill	5W	Slight	Moderate	Moderate	Moderate	Pin oak-------------	90	72	American sycamore, black spruce, hackberry, European larch, green ash, pin oak, red maple, swamp white oak.
						Eastern cottonwood--	---	---	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
3115------------ Dockery	4A	Slight	Slight	Slight	Slight	Pin oak-------------	76	58	Pin oak, pecan, eastern cottonwood.
3284------------ Tice	5A	Slight	Slight	Slight	Slight	Pin oak-------------	96	78	American sycamore, eastern cottonwood, green ash, yellow-poplar, red maple, cherrybark oak.
						Sweetgum------------	86	95	
						Yellow-poplar-------	90	90	
						Virginia pine-------	90	135	
						Eastern cottonwood--	---	---	
						White ash-----------	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
3304------------ Landes	7A	Slight	Slight	Slight	Slight	Yellow-poplar-------	95	98	Eastern cottonwood, yellow-poplar, American sycamore, sweetgum, green ash, black walnut, eastern white pine, sugar maple.
						Eastern cottonwood--	105	141	
						American sycamore---	---	---	
						Sweetgum------------	---	---	
						Green ash-----------	---	---	
3682------------ Medway	5A	Slight	Slight	Slight	Slight	Northern red oak----	86	68	Eastern white pine, yellow-poplar, black walnut, white ash, red pine, northern red oak, white oak.
						Yellow-poplar-------	96	100	
						Sugar maple---------	---	---	
						White oak-----------	---	---	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						White ash-----------	---	---	
8070------------ Beaucoup	5W	Slight	Severe	Moderate	Moderate	Pin oak-------------	90	72	Eastern cottonwood, red maple, American sycamore, sweetgum, pin oak.
						Eastern cottonwood--	100	128	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	
8078------------ Arenzville	3A	Slight	Slight	Slight	Slight	Northern red oak----	65	48	Red pine, eastern white pine, white spruce, northern red oak, black walnut.
						Bur oak-------------	---	---	
						Silver maple--------	---	---	
8088B----------- Sparta	4S	Slight	Slight	Severe	Slight	Northern red oak----	70	52	Red pine, eastern white pine, jack pine.
						Eastern white pine--	---	---	
						Red pine------------	---	---	
						Jack pine-----------	---	---	
8107, 8107+----- Sawmill	5W	Slight	Moderate	Moderate	Moderate	Pin oak-------------	90	72	American sycamore, black spruce, hackberry, European larch, green ash, pin oak, red maple, swamp white oak.
						Eastern cottonwood--	---	---	
						Sweetgum------------	---	---	
						Cherrybark oak------	---	---	
						American sycamore---	---	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
8284------------ Tice	5A	Slight	Slight	Slight	Slight	Pin oak-------------	96	78	American sycamore, eastern cottonwood, green ash, yellow-poplar, red maple, cherrybark oak.
						Sweetgum------------	86	95	
						Yellow-poplar-------	90	90	
						Virginia pine-------	90	135	
						Eastern cottonwood--	---	---	
						White ash-----------	---	---	
8304------------ Landes	7A	Slight	Slight	Slight	Slight	Yellow-poplar-------	95	98	Eastern cottonwood, yellow-poplar, American sycamore, sweetgum, green ash, black walnut, eastern white pine, sugar maple.
						Eastern cottonwood--	105	141	
						American sycamore---	---	---	
						Sweetgum------------	---	---	
						Green ash-----------	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
30G Hamburg	Siberian peashrub	Osage-orange, Russian-olive, eastern redcedar, Washington hawthorn.	Honeylocust, northern catalpa, green ash, bur oak, black locust.	Siberian elm	---
36A, 36B, 36C2 Tama	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
37 Worthen	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
43 Ipava	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
49 Watseka	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
53B, 53D Bloomfield	Siberian peashrub	Radiant crabapple, eastern redcedar, autumn-olive, Washington hawthorn, Amur honeysuckle, lilac.	Austrian pine, jack pine, red pine.	Eastern white pine	---
54B, 54D, 54E Plainfield	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac.	Red pine, Austrian pine, jack pine.	Eastern white pine	---
67 Harpster	---	Nannyberry viburnum, Washington hawthorn.	White spruce, northern whitecedar, eastern redcedar, green ash, Osage-orange.	Black willow	---

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
68---------------- Sable	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
88B, 88D---------- Sparta	Siberian peashrub	Amur honeysuckle, lilac, eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive.	Red pine, jack pine, Austrian pine.	Eastern white pine	---
89---------------- Maumee	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
98B--------------- Ade	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac, silky dogwood.	Austrian pine, jack pine, red pine.	Eastern white pine	---
100--------------- Palms	Whitebelle honeysuckle, common ninebark.	Amur honeysuckle, Amur privet, silky dogwood, nannyberry viburnum.	Tall purple willow	Golden willow, black willow.	Imperial Carolina poplar.
103--------------- Houghton	Whitebelle honeysuckle, common ninebark.	Amur honeysuckle, Amur privet, silky dogwood, nannyberry viburnum.	Tall purple willow	Golden willow, black willow.	Imperial Carolina poplar.
125--------------- Selma	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
131A, 131B, 131C2, 131D2, 131F------ Alvin	---	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, northern whitecedar, Osage-orange, eastern redcedar.	Eastern white pine, red pine, Norway spruce.	---

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
150A, 150B, 150C2-Onarga	---	Amur privet, Washington hawthorn, American cranberrybush, Amur honeysuckle.	Austrian pine, northern whitecedar, Osage-orange, eastern redcedar.	Red pine, Norway spruce, eastern white pine.	---
151-Ridgeville	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
152-Drummer	---	American cranberrybush, Amur honeysuckle, silky dogwood, Amur privet.	Norway spruce, Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine.	Eastern white pine	Pin oak.
153-Pella	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
159A, 159B, 159C2-Pillot	Siberian peashrub	Amur honeysuckle, lilac, silky dogwood, eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
198-Elburn	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, northern whitecedar, Washington hawthorn, blue spruce.	Norway spruce	Eastern white pine, pin oak.
199A, 199B-Plano	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
200-Orio	---	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, Norway spruce, northern whitecedar, Austrian pine, white fir, Washington hawthorn.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
201 Gilford	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, northern whitecedar, Washington hawthorn, blue spruce, white fir, Austrian pine.	Eastern white pine	Pin oak.
206 Thorp	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
244 Hartsburg	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
266 Disco	---	Amur honeysuckle, Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush.	Austrian pine, northern whitecedar, Osage-orange, eastern redcedar.	Eastern white pine, Norway spruce, red pine.	---
271D2 Timula	---	Osage-orange, Russian-olive, eastern redcedar, Washington hawthorn.	Honeylocust, northern catalpa, green ash.	---	---
272 Edgington	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, Norway spruce, northern whitecedar, blue spruce, Washington hawthorn.	Eastern white pine	Pin oak.
280B, 280C2, 280D2, 280D3, 280F Fayette	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
374 Proctor	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
379A, 379B-------- Dakota	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
430B-------------- Raddle	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
447--------------- Canisteo	---	Washington hawthorn, Tatarian honeysuckle, Washington hawthorn.	White spruce, northern whitecedar, green ash.	Black willow------	---
683--------------- Lawndale	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir, Austrian pine.	Norway spruce-----	Pin oak, eastern white pine.
684A, 684B, 684C2- Broadwell	---	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
685C2------------- Middletown	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
770--------------- Udolpho	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet, Washington hawthorn.	White fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
772--------------- Marshan	---	Common ninebark, redosier dogwood, silky dogwood, nannyberry viburnum, American cranberrybush, northern whitecedar.	Balsam fir, white spruce.	Green ash, white ash, red maple, silver maple.	---

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
965D2:					
Tallula	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
Bold	Siberian peashrub	Osage-orange, jack pine, eastern redcedar, Washington hawthorn, Russian-olive.	Northern catalpa, honeylocust.	---	---
1070 Beaucoup	---	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
1166 Cohoctah	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Northern whitecedar, Norway spruce, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
1201 Gilford	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, northern whitecedar, Washington hawthorn, blue spruce, white fir, Austrian pine.	Eastern white pine	Pin oak.
3088B Sparta	Siberian peashrub	Amur honeysuckle, lilac, eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive.	Red pine, jack pine, Austrian pine.	Eastern white pine	---
3107, 3107+ Sawmill	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
3115. Dockery	---	Silky dogwood, Amur honeysuckle, American cranberrybush, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir, Austrian pine.	Norway spruce	Eastern white pine, pin oak.
3284. Tice	---	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
3302. Ambraw	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
3304. Landes	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
3682. Medway	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine.
8070. Beaucoup	---	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
8078. Arenzville	---	Amur privet, Amur honeysuckle, silky dogwood, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Pin oak, eastern white pine.
8088B. Sparta	Siberian peashrub	Amur honeysuckle, lilac, eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive.	Red pine, jack pine, Austrian pine.	Eastern white pine	---

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
8107, 8107+: Sawmill	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
8284: Tice	---	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
8302: Ambraw	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
8304: Landes	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
8400: Calco	---	Lilac, Amur honeysuckle, Siberian peashrub, northern whitecedar.	Hackberry, eastern redcedar, bur oak, white spruce.	Honeylocust, golden willow, green ash.	Eastern cottonwood.
8452: Riley	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir, Austrian pine.	Norway spruce	Pin oak, eastern white pine.

TABLE 9.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe")

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
30G: Hamburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
36A: Tama	Slight	Slight	Slight	Slight	Slight.
36B: Tama	Slight	Slight	Moderate: slope.	Slight	Slight.
36C2: Tama	Slight	Slight	Severe: slope.	Slight	Slight.
37: Worthen	Slight	Slight	Slight	Slight	Slight.
43: Ipava	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
49: Watseka	Severe: wetness.	Moderate: wetness, too sandy.	Severe: wetness.	Moderate: wetness, too sandy.	Moderate: wetness, droughty.
53B: Bloomfield	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
53D: Bloomfield	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Moderate: droughty, slope, too sandy.
54B: Plainfield	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
54D: Plainfield	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
54E: Plainfield	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty, slope.
67: Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
68: Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
88B: Sparta	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, small stones.	Moderate: too sandy.	Moderate: droughty.
88D: Sparta	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
89 Maumee	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
98B Ade	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
100 Palms	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
103 Houghton	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
125 Selma	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
131A Alvin	Slight	Slight	Slight	Slight	Moderate: droughty.
131B Alvin	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
131C2 Alvin	Slight	Slight	Severe: slope.	Slight	Moderate: droughty.
131D2 Alvin	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
131F Alvin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
150A Onarga	Slight	Slight	Slight	Slight	Slight.
150B Onarga	Slight	Slight	Moderate: slope.	Slight	Slight.
150C2 Onarga	Slight	Slight	Severe: slope.	Slight	Slight.
151 Ridgeville	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
152 Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
153 Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
159A Pillot	Slight	Slight	Slight	Slight	Slight.
159B Pillot	Slight	Slight	Moderate: slope.	Slight	Slight.
159C2 Pillot	Slight	Slight	Severe: slope.	Slight	Slight.
198 Elburn	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
199A: Plano	Slight	Slight	Slight	Slight	Slight.
199B: Plano	Slight	Slight	Moderate: slope.	Slight	Slight.
200: Orio	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
201: Gilford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
206: Thorp	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
244: Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
266: Disco	Slight	Slight	Slight	Slight	Slight.
271D2: Timula	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
272: Edgington	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
280B: Fayette	Slight	Slight	Moderate: slope.	Slight	Slight.
280C2: Fayette	Slight	Slight	Severe: slope.	Slight	Slight.
280D2: Fayette	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
280D3: Fayette	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
280F: Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
374: Proctor	Slight	Slight	Slight	Slight	Slight.
379A: Dakota	Slight	Slight	Moderate: small stones.	Slight	Slight.
379B: Dakota	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
430B: Raddle	Slight	Slight	Moderate: slope.	Slight	Slight.
447: Canisteo	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
683: Lawndale	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
684A: Broadwell	Slight	Slight	Slight	Slight	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
684B: Broadwell	Slight	Slight	Moderate: slope.	Slight	Slight.
684C2: Broadwell	Slight	Slight	Severe: slope.	Slight	Slight.
685C2: Middletown	Slight	Slight	Severe: slope.	Slight	Slight.
770: Udolpho	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
772: Marshan	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
965D2:					
Tallula	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Bold	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
1070: Beaucoup	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
1166: Cohoctah	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
1201: Gilford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
3088B: Sparta	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, small stones.	Moderate: too sandy.	Moderate: droughty.
3107, 3107+: Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
3115: Dockery	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
3284: Tice	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Severe: flooding.
3302: Ambraw	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
3304: Landes	Severe: flooding.	Moderate: flooding.	Slight	Moderate: flooding.	Severe: flooding.
3682: Medway	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
8070 Beaucoup	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
8078 Arenzville	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
8088B Sparta	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, small stones.	Moderate: too sandy.	Moderate: droughty.
8107, 8107+ Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
8284 Tice	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
8302 Ambraw	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
8304 Landes	Severe: flooding.	Slight	Slight	Slight	Moderate: small stones.
8400 Calco	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
8452 Riley	Severe: flooding.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, flooding.

TABLE 10.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor")

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
30G: Hamburg	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
36A, 36B: Tama	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
36C2: Tama	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
37: Worthen	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
43: Ipava	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
49: Watseka	Fair	Fair	Good	Good	Good	Fair	Poor	Fair	Good	Poor.
53B, 53D: Bloomfield	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
54B: Plainfield	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
54D, 54E: Plainfield	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
67: Harpster	Fair	Fair	Good	Fair	Fair	Good	Fair	Fair	Fair	Fair.
68: Sable	Fair	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
88B: Sparta	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
88D: Sparta	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
89: Maumee	Fair	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
98B: Ade	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
100: Palms	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
103: Houghton	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
125: Selma	Good	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
131A, 131B: Alvin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
131C2, 131D2-------- Alvin	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
131F---------------- Alvin	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
150A, 150B---------- Onarga	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
150C2--------------- Onarga	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
151----------------- Ridgeville	Good	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
152----------------- Drummer	Fair	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
153----------------- Pella	Good	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
159A, 159B---------- Pillot	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
159C2--------------- Pillot	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
198----------------- Elburn	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
199A, 199B---------- Plano	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
200----------------- Orio	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
201----------------- Gilford	Fair	Poor	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.
206----------------- Thorp	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good.
244----------------- Hartsburg	Fair	Fair	Good	Fair	Fair	Good	Good	Fair	Fair	Good.
266----------------- Disco	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
271D2--------------- Timula	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
272----------------- Edgington	Fair	Fair	Good	Fair	Fair	Good	Good	Fair	Fair	Good.
280B---------------- Fayette	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
280C2, 280D2-------- Fayette	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
280D3---------------- Fayette	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
280F---------------- Fayette	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
374---------------- Proctor	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
379A, 379B--------- Dakota	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
430B---------------- Raddle	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
447---------------- Canisteo	Good	Good	Fair	Fair	Fair	Good	Good	Fair	Fair	Fair.
683---------------- Lawndale	Fair	Good	Good	Good	Fair	Fair	Fair	Good	Good	Fair.
684A, 684B, 684C2-- Broadwell	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
685C2-------------- Middletown	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
770---------------- Udolpho	Good	Good	Good	Good	Fair	Good	Good	Good	Good	Good.
772---------------- Marshan	Good	Good	Good	Fair	Poor	Good	Good	Good	Fair	Good.
965D2:										
Tallula-----------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Bold--------------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
1070--------------- Beaucoup	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
1166--------------- Cohoctah	Poor	Poor	Poor	Good	Good	Good	Good	Poor	Good	Good.
1201--------------- Gilford	Fair	Poor	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.
3088B-------------- Sparta	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
3107, 3107+-------- Sawmill	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3115--------------- Dockery	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
3284--------------- Tice	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
3302---------------- Ambraw	Good	Fair	Good	Good	Fair	Good	Good	Good	Good	Good.
3304---------------- Landes	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
3682---------------- Medway	Poor	Fair	Fair	Good	Good	Poor	Poor	Fair	Good	Poor.
8070---------------- Beaucoup	Good	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
8078---------------- Arenzville	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
8088B--------------- Sparta	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
8107, 8107+--------- Sawmill	Good	Good	Good	Fair	Fair	Good	Fair	Good	Fair	Fair.
8284---------------- Tice	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
8302---------------- Ambraw	Good	Fair	Good	Good	Fair	Good	Good	Good	Good	Good.
8304---------------- Landes	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8400---------------- Calco	Good	Fair	Good	Poor	Very poor.	Good	Good	Fair	Poor	Fair.
8452---------------- Riley	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
30G Hamburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
36A, 36B Tama	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
36C2 Tama	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: frost action, low strength.	Slight.
37 Worthen	Slight	Slight	Slight	Slight	Severe: low strength, frost action.	Slight.
43 Ipava	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
49 Watseka	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: wetness, droughty.
53B Bloomfield	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty, too sandy.
53D Bloomfield	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope, too sandy.
54B Plainfield	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
54D Plainfield	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
54E Plainfield	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
67 Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
68 Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
88B Sparta	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
88D: Sparta	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
89: Maumee	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
98B: Ade	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
100: Palms	Severe: excess humus, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
103: Houghton	Severe: excess humus, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
125: Selma	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
131A, 131B: Alvin	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Moderate: droughty.
131C2: Alvin	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Moderate: droughty.
131D2: Alvin	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: droughty, slope.
131F: Alvin	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
150A, 150B: Onarga	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Slight.
150C2: Onarga	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
151: Ridgeville	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
152: Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
153: Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
159A, 159B: Pillot	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
159C2------------- Pillot	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
198--------------- Elburn	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
199A, 199B-------- Plano	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
200--------------- Orio	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
201--------------- Gilford	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
206--------------- Thorp	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
244--------------- Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
266--------------- Disco	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Slight.
271D2------------- Timula	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
272--------------- Edgington	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
280B-------------- Fayette	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
280C2------------- Fayette	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
280D2, 280D3------ Fayette	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
280F-------------- Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
374--------------- Proctor	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
379A, 379B-------- Dakota	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: low strength, frost action.	Slight.
430B-------------- Raddle	Slight---------	Slight---------	Slight---------	Slight---------	Severe: frost action.	Slight.
447--------------- Canisteo	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
683--------------- Lawndale	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
684A, 684B-------- Broadwell	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
684C2------------- Broadwell	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
685C2------------- Middletown	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
770--------------- Udolpho	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
772--------------- Marshan	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
965D2:						
Tallula-----------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
Bold--------------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
1070-------------- Beaucoup	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
1166-------------- Cohoctah	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: wetness, flooding.
1201-------------- Gilford	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
3088B------------- Sparta	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
3107, 3107+------- Sawmill	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
3115-------------- Dockery	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding, frost action.	Severe: flooding.
3284-------------- Tice	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding, frost action.	Severe: flooding.
3302-------------- Ambraw	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
3304-------------- Landes	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
3682-------------- Medway	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action, low strength.	Severe: flooding.
8070-------------- Beaucoup	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding.
8078-------------- Arenzville	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.	Moderate: flooding.
8088B------------- Sparta	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: droughty.
8107, 8107+------- Sawmill	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
8284-------------- Tice	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding, frost action.	Moderate: wetness, flooding.
8302-------------- Ambraw	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
8304-------------- Landes	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: small stones.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
8400 Calco	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
8452 Riley	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding, frost action.	Moderate: wetness, flooding.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "good," and other terms. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
30G: Hamburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
36A: Tama	Slight	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
36B: Tama	Slight	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
36C2: Tama	Slight	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
37: Worthen	Slight	Moderate: seepage.	Slight	Slight	Good.
43: Ipava	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
49: Watseka	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, seepage, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness, seepage.
53B: Bloomfield	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
53D: Bloomfield	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
54B: Plainfield	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
54D: Plainfield	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
54E: Plainfield	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
67: Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
68: Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
88B: Sparta	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
88D: Sparta	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
89: Maumee	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
98B: Ade	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
100: Palms	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
103: Houghton	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
125: Selma	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
131A, 131B: Alvin	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage.
131C2: Alvin	Slight	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage.
131D2: Alvin	Moderate: slope.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage.
131F: Alvin	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, slope.
150A, 150B: Onarga	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: thin layer.
150C2: Onarga	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: thin layer.
151: Ridgeville	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: wetness.	Poor: seepage, too sandy, wetness.
152: Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
153: Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
159A, 159B---------- Pillot	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
159C2--------------- Pillot	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
198----------------- Elburn	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
199A---------------- Plano	Slight-----------	Moderate: seepage.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
199B---------------- Plano	Slight-----------	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
200----------------- Orio	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: ponding.	Poor: seepage, too sandy, ponding.
201----------------- Gilford	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: ponding, thin layer.
206----------------- Thorp	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
244----------------- Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
266----------------- Disco	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
271D2--------------- Timula	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
272----------------- Edgington	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
280B---------------- Fayette	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
280C2--------------- Fayette	Moderate: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
280D2, 280D3-------- Fayette	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
280F---------------- Fayette	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
374----------------- Proctor	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey, thin layer.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
379A, 379B Dakota	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
430B Raddle	Slight	Moderate: seepage, slope.	Slight	Slight	Good.
447 Canisteo	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
683 Lawndale	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: hard to pack, wetness.
684A, 684B Broadwell	Slight	Severe: seepage.	Severe: seepage.	Slight	Fair: too clayey, thin layer.
684C2 Broadwell	Slight	Severe: seepage, slope.	Severe: seepage.	Slight	Fair: too clayey, thin layer.
685C2 Middletown	Slight	Severe: seepage, slope.	Severe: seepage.	Slight	Fair: too clayey, thin layer.
770 Udolpho	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
772 Marshan	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
965D2:					
Tallula	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Bold	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
1070 Beaucoup	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
1166 Cohoctah	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness.
1201 Gilford	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: ponding, thin layer.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
3088B----------------Sparta	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
3107, 3107+---------Sawmill	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3115----------------Dockery	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
3284----------------Tice	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack.
3302----------------Ambraw	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
3304----------------Landes	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: seepage, too sandy.
3682----------------Medway	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness, seepage.	Fair: wetness.
8070----------------Beaucoup	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
8078----------------Arenzville	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
8088B---------------Sparta	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
8107, 8107+---------Sawmill	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
8284----------------Tice	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack.
8302----------------Ambraw	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
8304----------------Landes	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: seepage, too sandy.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
8400----------------- Calco	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
8452----------------- Riley	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
30G Hamburg	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
36A, 36B, 36C2 Tama	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
37 Worthen	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
43 Ipava	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
49 Watseka	Fair: wetness.	Probable	Improbable: too sandy.	Fair: too sandy.
53B, 53D Bloomfield	Good	Probable	Improbable: too sandy.	Poor: too sandy.
54B, 54D Plainfield	Good	Probable	Improbable: too sandy.	Poor: too sandy.
54E Plainfield	Fair: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.
67 Harpster	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
68 Sable	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
88B, 88D Sparta	Good	Probable	Improbable: too sandy.	Poor: too sandy.
89 Maumee	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
98B Ade	Good	Probable	Improbable: too sandy.	Fair: too sandy.
100 Palms	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
103 Houghton	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
125 Selma	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
131A, 131B, 131C2, 131D2 Alvin	Good	Probable	Improbable: too sandy.	Poor: too sandy.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
131F: Alvin	Fair: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.
150A, 150B, 150C2: Onarga	Good	Probable	Improbable: too sandy.	Fair: area reclaim, thin layer.
151: Ridgeville	Fair: wetness.	Probable	Improbable: too sandy.	Good.
152: Drummer	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
153: Pella	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
159A, 159B, 159C2: Pillot	Good	Probable	Improbable: too sandy.	Fair: area reclaim, small stones.
198: Elburn	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
199A, 199B: Plano	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
200: Orio	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
201: Gilford	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
206: Thorp	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
244: Hartsburg	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
266: Disco	Good	Probable	Improbable: too sandy.	Fair: thin layer.
271D2: Timula	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
272: Edgington	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
280B, 280C2: Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
280D2, 280D3: Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
280F: Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
374: Proctor	Good	Probable	Improbable: too sandy.	Fair: area reclaim.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
379A, 379B------------ Dakota	Good----------------	Probable------------	Probable------------	Poor: small stones, area reclaim.
430B------------------ Raddle	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
447------------------- Canisteo	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: wetness.
683------------------- Lawndale	Fair: wetness.	Probable------------	Improbable: too sandy.	Good.
684A, 684B, 684C2----- Broadwell	Good----------------	Probable------------	Improbable: too sandy.	Good.
685C2----------------- Middletown	Good----------------	Probable------------	Improbable: too sandy.	Good.
770------------------- Udolpho	Fair: wetness.	Probable------------	Improbable: too sandy.	Fair: thin layer.
772------------------- Marshan	Poor: wetness.	Probable------------	Probable------------	Poor: area reclaim, wetness.
965D2:				
Tallula---------------	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
Bold------------------	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
1070------------------ Beaucoup	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
1166------------------ Cohoctah	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
1201------------------ Gilford	Poor: wetness.	Probable------------	Improbable: too sandy.	Poor: wetness.
3088B----------------- Sparta	Good----------------	Probable------------	Improbable: too sandy.	Poor: too sandy.
3107, 3107+----------- Sawmill	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3115------------------ Dockery	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
3284------------------ Tice	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
3302------------------ Ambraw	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
3304 Landes	Good	Probable	Improbable: too sandy.	Fair: too sandy, small stones, thin layer.
3682 Medway	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
8070 Beaucoup	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
8078 Arenzville	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
8088B Sparta	Good	Probable	Improbable: too sandy.	Poor: too sandy.
8107, 8107+ Sawmill	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
8284 Tice	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
8302 Ambraw	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
8304 Landes	Good	Probable	Improbable: too sandy.	Fair: too sandy, small stones, thin layer.
8400 Calco	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
8452 Riley	Fair: wetness.	Probable	Improbable: too sandy.	Fair: thin layer.

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
30G Hamburg	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
36A Tama	Moderate: seepage.	Slight	Deep to water	Favorable	Erodes easily	Erodes easily.
36B, 36C2 Tama	Moderate: slope, seepage.	Slight	Deep to water	Slope	Erodes easily	Erodes easily.
37 Worthen	Moderate: seepage.	Moderate: piping.	Deep to water	Favorable	Erodes easily	Erodes easily.
43 Ipava	Slight	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
49 Watseka	Severe: seepage.	Severe: piping, seepage, wetness.	Cutbanks cave	Wetness, droughty.	Wetness, too sandy, soil blowing.	Wetness, droughty.
53B Bloomfield	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty, rooting depth.
53D Bloomfield	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty, rooting depth.
54B Plainfield	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
54D, 54E Plainfield	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
67 Harpster	Moderate: seepage.	Severe: ponding, piping.	Ponding, frost action.	Ponding	Ponding	Wetness.
68 Sable	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
88B Sparta	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
88D Sparta	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
89 Maumee	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowing.	Wetness, droughty, rooting depth.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
98B: Ade	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
100: Palms	Severe: seepage.	Severe: excess humus, ponding.	Ponding, subsides, frost action.	Ponding, soil blowing.	Ponding, soil blowing.	Wetness, rooting depth.
103: Houghton	Severe: seepage.	Severe: excess humus, ponding.	Ponding, subsides, frost action.	Ponding, soil blowing.	Ponding, soil blowing.	Wetness.
125: Selma	Severe: seepage.	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
131A: Alvin	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty	Soil blowing	Droughty, rooting depth.
131B, 131C2: Alvin	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty.	Soil blowing	Droughty, rooting depth.
131D2, 131F: Alvin	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty.	Slope, soil blowing.	Slope, droughty, rooting depth.
150A: Onarga	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing	Soil blowing	Favorable.
150B, 150C2: Onarga	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing, slope.	Soil blowing	Favorable.
151: Ridgeville	Severe: seepage.	Severe: seepage, piping, wetness.	Frost action, cutbanks cave.	Wetness, soil blowing.	Wetness, too sandy, soil blowing.	Wetness.
152: Drummer	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
153: Pella	Moderate: seepage.	Severe: piping, ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
159A: Pillot	Severe: seepage.	Severe: seepage, piping.	Deep to water	Favorable	Erodes easily, too sandy.	Erodes easily.
159B, 159C2: Pillot	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope	Erodes easily, too sandy.	Erodes easily.
198: Elburn	Moderate: seepage.	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
199A: Plano	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Favorable	Erodes easily	Erodes easily.
199B: Plano	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope	Erodes easily	Erodes easily.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
200 Orio	Moderate: seepage.	Severe: seepage, piping, ponding.	Ponding, frost action, cutbanks cave.	Ponding	Ponding, too sandy.	Wetness.
201 Gilford	Severe: seepage.	Severe: piping, ponding.	Ponding, frost action, cutbanks cave.	Ponding, soil blowing.	Ponding, too sandy, soil blowing.	Wetness.
206 Thorp	Severe: seepage.	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
244 Hartsburg	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
266 Disco	Severe: seepage.	Severe: seepage, piping.	Deep to water	Soil blowing	Too sandy, soil blowing.	Favorable.
271D2 Timula	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
272 Edgington	Slight	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
280B, 280C2 Fayette	Moderate: seepage, slope.	Slight	Deep to water	Slope	Erodes easily	Erodes easily.
280D2 Fayette	Severe: slope.	Slight	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
280D3 Fayette	Severe: slope.	Slight	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
280F Fayette	Severe: slope.	Slight	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
374 Proctor	Severe: seepage.	Severe: thin layer.	Deep to water	Favorable	Erodes easily	Erodes easily.
379A Dakota	Severe: seepage.	Severe: seepage, piping.	Deep to water	Soil blowing	Too sandy, soil blowing.	Favorable.
379B Dakota	Severe: seepage.	Severe: seepage, piping.	Deep to water	Soil blowing, slope.	Too sandy, soil blowing.	Favorable.
430B Raddle	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope	Erodes easily	Erodes easily.
447 Canisteo	Severe: seepage.	Severe: wetness.	Frost action	Wetness	Wetness	Wetness.
683 Lawndale	Severe: seepage.	Severe: wetness.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
684A---------------Broadwell	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Favorable-------	Erodes easily	Erodes easily.
684B, 684C2--------Broadwell	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Slope-----------	Erodes easily	Erodes easily.
685C2--------------Middletown	Moderate: seepage, slope.	Moderate: thin layer.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
770----------------Udolpho	Severe: seepage.	Severe: seepage, piping, wetness.	Frost action, cutbanks cave.	Wetness---------	Wetness, too sandy.	Wetness.
772----------------Marshan	Severe: seepage.	Severe: seepage, piping, wetness.	Frost action, cutbanks cave.	Wetness---------	Wetness, too sandy.	Wetness.
965D2:						
Tallula-----------	Severe: slope.	Severe: piping.	Deep to water	Slope-----------	Slope, erodes easily.	Slope, erodes easily.
Bold--------------	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
1070---------------Beaucoup	Slight-----------	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding---------	Wetness.
1166---------------Cohoctah	Severe: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, flooding.	Wetness---------	Wetness.
1201---------------Gilford	Severe: seepage.	Severe: piping, ponding.	Ponding, frost action, cutbanks cave.	Ponding, soil blowing.	Ponding, too sandy, soil blowing.	Wetness.
3088B--------------Sparta	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
3107, 3107+--------Sawmill	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness---------	Wetness.
3115---------------Dockery	Moderate: seepage.	Moderate: piping, wetness.	Flooding, frost action.	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
3284---------------Tice	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness---------	Wetness---------	Favorable.
3302---------------Ambraw	Moderate: seepage.	Severe: wetness, piping.	Flooding, frost action.	Wetness, flooding.	Wetness, erodes easily.	Wetness, erodes easily.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
3304 Landes	Severe: seepage.	Severe: seepage, piping.	Deep to water	Favorable	Too sandy, soil blowing.	Favorable.
3682 Medway	Severe: seepage.	Severe: piping, wetness.	Frost action, flooding.	Wetness, flooding.	Wetness	Favorable.
8070 Beaucoup	Slight	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding	Wetness.
8078 Arenzville	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
8088B Sparta	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
8107, 8107+ Sawmill	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
8284 Tice	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness	Wetness	Favorable.
8302 Ambraw	Moderate: seepage.	Severe: wetness, piping.	Flooding, frost action.	Wetness, flooding.	Wetness, erodes easily.	Wetness, erodes easily.
8304 Landes	Severe: seepage.	Severe: seepage, piping.	Deep to water	Favorable	Too sandy, soil blowing.	Favorable.
8400 Calco	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
8452 Riley	Severe: seepage.	Severe: seepage, piping, wetness.	Flooding, frost action.	Wetness	Wetness, too sandy.	Favorable.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
30G-------------- Hamburg	0-6	Silt loam--------	CL-ML, ML	A-4	0	100	100	100	95-100	<25	NP-5
	6-60	Silt loam, very fine sandy loam, silt.	CL-ML, ML	A-4	0	100	100	100	95-100	<25	NP-5
36A, 36B--------- Tama	0-16	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	100	95-100	25-40	5-15
	16-38	Silty clay loam	CL	A-7	0	100	100	100	95-100	40-50	15-25
	38-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
36C2------------- Tama	0-8	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	100	95-100	25-40	5-15
	8-30	Silty clay loam	CL	A-7	0	100	100	100	95-100	40-50	15-25
	30-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
37--------------- Worthen	0-34	Silt loam--------	CL	A-4, A-6	0	100	100	95-100	80-100	25-40	7-21
	34-60	Silt loam--------	CL	A-4, A-6	0	100	100	95-100	80-100	25-40	7-21
43--------------- Ipava	0-8	Silt loam--------	CL	A-6	0	100	100	95-100	90-100	25-40	10-20
	8-44	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	95-100	90-100	45-70	25-40
	44-60	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	100	100	95-100	90-100	25-40	5-20
49--------------- Watseka	0-16	Loamy sand-------	SM, SC-SM	A-2	0	100	95-100	80-100	17-35	<25	NP-5
	16-60	Fine sand, sand, loamy fine sand.	SP, SM, SP-SM	A-3, A-2	0	90-100	90-100	60-80	3-25	<20	NP-4
53B, 53D--------- Bloomfield	0-8	Sand-------------	SM, SP, SP-SM	A-2-4, A-3	0	100	100	60-90	4-20	---	NP
	8-45	Fine sand, loamy fine sand, sand.	SP, SM, SP-SM	A-2-4, A-3	0	100	100	70-100	4-35	---	NP
	45-60	Fine sand, loamy fine sand, sand.	SM, SP, SP-SM	A-2-4, A-3	0	100	100	65-100	4-35	<20	NP-3
54B, 54D, 54E---- Plainfield	0-9	Sand-------------	SP-SM, SM, SP	A-3, A-2, A-1	0	75-100	75-100	40-80	3-35	---	NP
	9-31	Sand-------------	SP, SM, SP-SM	A-3, A-1, A-2	0	75-100	75-100	40-70	1-15	---	NP
	31-60	Sand, fine sand	SP, SM, SP-SM	A-3, A-1, A-2	0	75-100	75-100	40-90	1-15	---	NP
67--------------- Harpster	0-15	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	90-100	45-60	20-35
	15-20	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	85-100	40-60	20-35
	20-46	Silty clay loam, silt loam, loam.	CL, CH	A-6, A-7	0	100	95-100	95-100	70-100	35-55	20-35
	46-60	Stratified sandy loam to clay loam.	CL, CL-ML, SC, SC-SM	A-4, A-6, A-7	0	100	95-100	95-100	45-95	20-50	5-25
68--------------- Sable	0-16	Silty clay loam	CL, CH, ML, MH	A-7	0	100	100	95-100	95-100	41-65	15-35
	16-46	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	95-100	40-55	20-35
	46-60	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	95-100	30-40	10-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
88B, 88D: Sparta	0-23	Loamy sand	SM	A-2, A-4	0	85-100	85-100	50-95	15-50	---	NP
	23-38	Loamy fine sand, fine sand, sand.	SP-SM, SM	A-2, A-3, A-4	0	85-100	85-100	50-95	5-50	---	NP
	38-60	Sand, fine sand	SP-SM, SM, SP	A-2, A-3	0	85-100	85-100	50-95	2-30	---	NP
89: Maumee	0-18	Loamy sand	SM, SP-SM	A-2-4, A-3	0	95-100	90-100	50-75	5-30	<30	NP-5
	18-60	Sand, loamy fine sand, fine sand.	SP, SP-SM, SM	A-1-b, A-3, A-2-4	0	85-100	75-95	35-70	3-25	<30	NP
98B: Ade	0-22	Loamy fine sand	SM, SP-SM	A-2-4	0	100	100	65-80	10-35	---	NP
	22-31	Fine sand, loamy fine sand.	SP, SM, SP-SM	A-3, A-2-4	0	100	100	65-80	3-15	---	NP
	31-60	Stratified sand to loam.	SP, SM, SP-SM	A-3, A-2-4	0	100	100	65-80	3-15	---	NP
100: Palms	0-24	Muck	PT	---	---	---	---	---	---	---	---
	24-60	Clay loam, silty clay loam, fine sandy loam, silt loam.	CL-ML, CL	A-4, A-6	0	85-100	80-100	70-95	50-90	25-40	5-20
103: Houghton	0-60	Muck	PT	A-8	0	---	---	---	---	---	---
125: Selma	0-20	Clay loam	CL	A-6	0	100	100	85-100	60-90	30-40	11-20
	20-48	Sandy loam, loam, clay loam, silty clay loam.	CL, SC	A-6	0	100	95-100	80-95	38-85	24-36	11-19
	48-60	Stratified sand to silt loam.	SC-SM, SC, CL-ML, CL	A-2, A-4, A-6	0	90-100	85-100	60-90	30-70	15-35	5-20
131A, 131B: Alvin	0-5	Fine sandy loam	SM, ML	A-4, A-2	0	100	100	80-95	30-60	<25	NP-4
	5-18	Very fine sandy loam, sandy loam, loamy fine sand.	SM, ML	A-2, A-4	0	100	100	80-95	30-60	<25	NP-4
	18-45	Very fine sandy loam, sandy loam, loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	100	100	70-100	20-80	15-40	NP-15
	45-60	Very fine sand, fine sandy loam, loamy fine sand.	SP, SP-SM, SM	A-2, A-3, A-1	0	95-100	90-100	45-95	4-35	<20	NP-4
131C2, 131D2: Alvin	0-9	Fine sandy loam	SM, ML	A-4, A-2	0	100	100	80-95	30-60	<25	NP-4
	9-34	Very fine sandy loam, sandy loam, loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	100	100	70-100	20-80	15-40	NP-15
	34-60	Very fine sand, fine sandy loam, loamy fine sand.	SP, SP-SM, SM	A-2, A-3, A-1	0	95-100	90-100	45-95	4-35	<20	NP-4

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
131F-------------- Alvin	0-5	Fine sandy loam	SM, ML	A-4, A-2	0	100	100	80-95	30-60	<25	NP-4
	5-18	Very fine sandy loam, sandy loam, loamy fine sand.	SM, ML	A-2, A-4	0	100	100	80-95	30-60	<25	NP-4
	18-45	Very fine sandy loam, sandy loam, loam.	SM, SC, CL, ML	A-2, A-4, A-6	0	100	100	70-100	20-80	15-40	NP-15
	45-60	Very fine sand, fine sandy loam, loamy fine sand.	SP, SP-SM, SM	A-2, A-3, A-1	0	95-100	90-100	45-95	4-35	<20	NP-4
150A, 150B------- Onarga	0-18	Sandy loam-------	SC, SM, SC-SM	A-4, A-6, A-2	0	100	100	75-95	25-50	<28	NP-12
	18-33	Loam, sandy clay loam, fine sandy loam.	SC, CL, SC-SM, CL-ML	A-4, A-6, A-2-4, A-2-6	0	95-100	95-100	75-95	30-60	19-32	5-14
	33-60	Stratified sand to sandy loam.	SM, SP-SM, SC-SM	A-2, A-4	0	85-100	80-100	70-95	12-50	<20	NP-6
150C2------------ Onarga	0-9	Fine sandy loam	SC, SM, SC-SM	A-4, A-6, A-2	0	100	100	75-95	25-50	<28	NP-12
	9-38	Loam, sandy clay loam, fine sandy loam.	SC, CL, SC-SM, CL-ML	A-4, A-6, A-2-4, A-2-6	0	95-100	95-100	75-95	30-60	19-32	5-14
	38-60	Stratified sand to sandy loam.	SM, SP-SM, SC-SM	A-2, A-4	0	85-100	80-100	70-95	12-50	<20	NP-6
151-------------- Ridgeville	0-18	Sandy loam-------	SM, SC-SM	A-2, A-4	0	100	100	90-100	15-50	<25	NP-6
	18-36	Very fine sandy loam, sandy clay loam, loam.	SC-SM, SC, CL, CL-ML	A-4, A-6	0	95-100	95-100	75-95	35-60	20-35	5-15
	36-60	Loamy sand, sandy loam, fine sand.	SM, SC-SM, SC, SP-SM	A-2, A-4	0	90-100	90-100	70-100	10-50	<20	NP-8
152-------------- Drummer	0-19	Silty clay loam	CL	A-6, A-7	0	100	95-100	95-100	85-95	30-50	15-30
	19-41	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	95-100	95-100	85-95	30-50	15-30
	41-53	Loam, silt loam, clay loam.	CL	A-6, A-7	0-5	95-100	90-100	75-95	60-85	30-50	15-30
	53-60	Stratified loamy sand to silty clay loam.	SC, CL	A-4, A-6	0-5	95-100	85-95	75-95	45-80	20-35	7-20
153-------------- Pella	0-13	Silty clay loam	CL	A-7	0	100	95-100	90-100	85-95	40-50	15-25
	13-34	Silty clay loam, silty clay, clay loam.	CL	A-6, A-7	0	100	95-100	90-100	85-95	30-50	15-30
	34-41	Stratified silty clay loam to sandy loam.	CL	A-6, A-7	0-5	95-100	90-100	85-95	60-90	25-45	10-25
	41-60	Stratified sandy loam to silty clay loam.	SC-SM, SC, CL, CL-ML	A-2, A-4, A-6	0-5	90-100	80-100	50-100	30-85	20-35	7-20
159A, 159B------- Pillot	0-12	Silt loam--------	CL	A-6	0	100	90-100	85-100	85-100	25-40	10-20
	12-36	Silty clay loam, sandy clay loam, loam.	CL	A-6, A-7	0	100	90-100	70-100	50-100	30-45	10-25
	36-60	Loamy sand, sand, sandy loam.	SC-SM, SM, SP-SM	A-2, A-1, A-3	0-5	75-100	75-100	25-70	5-25	<25	NP-5

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
159C2------------ Pillot	0-9	Silt loam--------	CL	A-6	0	100	90-100	85-100	85-100	25-40	10-20
	9-36	Silty clay loam, sandy clay loam, loam.	CL	A-6, A-7	0	100	90-100	70-100	50-100	30-45	10-25
	36-60	Loamy sand, sand, sandy loam.	SC-SM, SM, SP-SM	A-2, A-1, A-3	0-5	75-100	75-100	25-70	5-25	<25	NP-5
198-------------- Elburn	0-19	Silt loam--------	CL	A-6	0	100	100	95-100	90-100	25-40	10-25
	19-46	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	75-90	30-50	15-35
	46-60	Loam, sandy loam, clay loam.	CL, CL-ML, SC, SC-SM	A-6, A-4, A-2	0	90-100	80-100	60-90	25-80	20-40	5-20
199A, 199B------- Plano	0-14	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	20-30	5-15
	14-49	Silty clay loam, silt loam.	CL	A-6	0	100	100	95-100	95-100	25-40	10-25
	49-60	Stratified silt loam to sandy loam.	ML, SM, CL, SC	A-4, A-2	0-5	90-100	85-95	60-90	30-70	<25	NP-10
200-------------- Orio	0-9	Loam-------------	CL-ML, CL	A-4, A-6	0	100	100	75-90	50-85	25-40	5-15
	9-25	Loam, sandy loam, loamy sand.	SM, SC, ML, CL	A-4, A-2-4	0	100	100	75-90	15-60	<35	2-10
	25-47	Sandy loam, sandy clay loam, clay loam.	CL, SC	A-6, A-7	0	100	100	80-95	35-75	30-45	10-20
	47-60	Loamy sand, sand, loamy fine sand.	SM, SC, SP-SM, SC-SM	A-2-4, A-3	0	100	100	60-90	5-35	20-30	NP-10
201-------------- Gilford	0-15	Sandy loam-------	SM, SC, SC-SM	A-4, A-2-4	0	95-100	95-100	60-80	30-45	<25	2-10
	15-27	Sandy loam, fine sandy loam.	SM, SC, SC-SM	A-2-4	0	95-100	95-100	55-70	20-35	15-30	NP-8
	27-36	Loamy sand, sand, loamy fine sand.	SM, SP, SP-SM	A-3, A-1-b, A-2-4	0	95-100	95-100	15-60	3-20	---	NP
	36-60	Sand, coarse sand, loamy sand.	SP, SP-SM, SM	A-1-b, A-2-4, A-3	0	95-100	95-100	15-60	3-20	---	NP
206-------------- Thorp	0-11	Silt loam--------	CL	A-6, A-4	0	95-100	95-100	90-100	75-95	20-40	8-19
	11-16	Silt loam--------	CL	A-4, A-6	0	95-100	95-100	90-100	75-95	25-35	7-15
	16-38	Silty clay loam, silt loam.	CL	A-7, A-6	0	95-100	95-100	90-100	75-95	35-50	13-27
	38-49	Silt loam, clay loam, sandy clay loam.	CL	A-6, A-4, A-7	0	90-100	90-100	90-100	70-90	20-50	8-26
	49-60	Sandy loam, sand	SM, ML, CL-ML, SC-SM	A-2, A-4	0	85-100	75-95	65-85	20-60	<20	NP-6
244-------------- Hartsburg	0-16	Silty clay loam	CL, ML	A-7, A-6	0	100	100	100	95-100	35-50	10-25
	16-30	Silty clay loam	CL, CH	A-7	0	100	100	95-100	95-100	40-55	20-30
	30-60	Silt loam, loam	CL	A-6	0	95-100	90-100	90-100	70-100	25-40	11-20
266-------------- Disco	0-41	Sandy loam-------	SM, SC, SC-SM	A-2, A-4	0	100	95-100	80-95	30-50	15-28	NP-10
	41-60	Sandy loam, loamy sand.	SM, SC, SC-SM	A-2, A-3	0	100	95-100	70-90	15-50	5-20	NP-10

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
271D2------------ Timula	0-22	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	85-100	25-35	NP-10
	22-60	Silt loam, silt	ML, CL-ML	A-4	0	100	100	95-100	85-100	25-35	NP-10
272-------------- Edgington	0-17	Silt loam--------	CL	A-6, A-4	0	100	100	95-100	90-100	30-40	9-17
	17-25	Silt loam--------	CL	A-6, A-4	0	100	100	95-100	90-100	25-40	7-16
	25-51	Silty clay loam	CL	A-7, A-6	0	100	100	95-100	90-100	35-50	15-25
	51-60	Silt loam--------	CL	A-6	0	100	100	95-100	90-100	25-40	10-20
280B------------- Fayette	0-10	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	10-46	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
	46-60	Silt loam--------	CL	A-6	0	100	100	100	95-100	30-40	10-20
280C2, 280D2----- Fayette	0-8	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	8-44	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
	44-60	Silt loam--------	CL	A-6	0	100	100	100	95-100	30-40	10-20
280D3------------ Fayette	0-8	Silty clay loam	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
	8-46	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
	46-60	Silt loam--------	CL	A-6	0	100	100	100	95-100	30-40	10-20
280F------------- Fayette	0-10	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	10-46	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
	46-60	Silt loam--------	CL	A-6	0	100	100	100	95-100	30-40	10-20
374-------------- Proctor	0-17	Silt loam--------	CL	A-6	0	100	100	95-100	85-100	25-40	10-20
	17-30	Silty clay loam	CL	A-6	0	100	100	95-100	85-100	30-40	10-20
	30-50	Clay loam, sandy loam.	SC, SM, CL, CL-ML	A-4, A-6	0	95-100	95-100	80-90	35-80	20-40	3-15
	50-60	Stratified loamy sand to sandy loam.	SM, SP-SM	A-2, A-1-b	0-5	75-95	50-75	20-50	5-30	---	NP
379A------------- Dakota	0-18	Fine sandy loam	SC, SC-SM, CL, CL-ML	A-4, A-2	0	95-100	85-100	50-90	25-55	20-30	4-10
	18-23	Loam, sandy clay loam, clay loam.	CL, SC	A-4, A-6	0	95-100	85-100	70-100	35-80	25-40	9-20
	23-36	Sandy loam, loamy sand, gravelly loamy coarse sand.	SM, SP, GM, GP	A-2, A-4, A-1, A-3	0-5	55-100	45-100	20-75	2-40	<21	NP-4
	36-60	Sand, gravelly coarse sand, loamy sand.	SP, GP, GM, SM	A-1, A-3, A-2	0-5	50-100	45-100	20-75	2-30	---	NP
379B------------- Dakota	0-18	Fine sandy loam	SC, SC-SM, CL, CL-ML	A-4, A-2	0	95-100	85-100	50-90	25-55	20-30	4-10
	18-32	Loam, sandy clay loam, clay loam.	CL, SC	A-4, A-6	0	95-100	85-100	70-100	35-80	25-40	9-20
	32-36	Sandy loam, loamy sand, gravelly loamy coarse sand.	SM, SP, GM, GP	A-2, A-4, A-1, A-3	0-5	55-100	45-100	20-75	2-40	<21	NP-4
	36-60	Sand, gravelly coarse sand, loamy sand.	SP, GP, GM, SM	A-1, A-3, A-2	0-5	50-100	45-100	20-75	2-30	---	NP

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
430B------------- Raddle	0-15	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	95-100	85-100	25-40	4-15
	15-60	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	20-35	4-15
447-------------- Canisteo	0-14	Loam-------------	CL	A-4, A-6	0	100	95-100	80-100	55-85	25-35	7-17
	14-48	Clay loam, loam, silt loam.	CL	A-6, A-7	0	95-100	90-100	85-95	65-85	30-45	10-20
	48-60	Loamy sand, sand	SM, SP-SM	A-2, A-3	0	95-100	90-100	50-75	5-25	---	NP
683-------------- Lawndale	0-13	Silt loam--------	CL	A-6, A-7, A-4	0	100	100	100	95-100	25-45	8-25
	13-43	Silty clay loam, silt loam.	CL, CH, ML, MH	A-7	0	100	100	100	95-100	40-55	15-25
	43-60	Loamy fine sand, fine sand, sand.	SM, SP-SM, SC-SM, SP	A-2, A-3	0	100	100	75-95	4-35	<20	NP-5
684A, 684B------- Broadwell	0-14	Silt loam--------	ML, CL	A-6, A-7, A-4	0	100	100	90-100	85-100	30-45	5-20
	14-42	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	30-45	10-25
	42-60	Loamy fine sand, fine sand, sand.	SM, SP-SM, SP, SC-SM	A-3, A-2	0	100	100	75-95	4-35	<20	NP-5
684C2------------ Broadwell	0-8	Silt loam--------	ML, CL	A-6, A-7, A-4	0	100	100	90-100	85-100	30-45	5-20
	8-48	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	30-45	10-25
	48-60	Loamy fine sand, fine sand, sand.	SM, SP-SM, SP, SC-SM	A-3, A-2	0	100	100	75-95	4-35	<20	NP-5
685C2------------ Middletown	0-7	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	90-100	25-40	5-15
	7-46	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-50	15-30
	46-60	Loamy fine sand, fine sand, loamy sand.	SM, SP-SM, SC, SC-SM	A-4, A-2, A-3	0	100	90-100	75-95	5-40	<20	NP-10
770-------------- Udolpho	0-14	Fine sandy loam	CL, ML	A-6, A-7	0	100	100	90-100	70-95	30-50	10-20
	14-27	Clay loam, loam, sandy clay loam.	CL, ML	A-6, A-7	0	100	100	80-95	60-85	30-50	10-20
	27-31	Sandy loam-------	SM, SC, SC-SM	A-2, A-4	0	100	100	80-95	30-50	15-30	NP-10
	31-60	Stratified coarse sand to loamy sand.	SP-SM, SM, SC-SM	A-2, A-3	0	100	95-100	80-90	5-20	<20	NP-5
772-------------- Marshan	0-15	Loam-------------	ML, CL	A-6, A-4	0	95-100	95-100	95-100	60-90	30-40	5-15
	15-38	Silty clay loam, clay loam, silt loam, loam.	CL	A-7, A-6	0	95-100	95-100	95-100	80-95	30-50	15-30
	38-60	Coarse sand, gravelly coarse sand, sand.	SP, SW, SP-SM	A-1	0-3	65-95	45-95	20-45	2-5	---	NP
965D2: Tallula---------	0-7	Silt loam--------	CL, CL-ML, ML	A-4, A-6, A-7	0	100	100	100	95-100	20-45	NP-20
	7-32	Silt loam--------	CL, CL-ML, ML	A-4, A-6	0	100	100	100	90-100	20-40	NP-20
	32-60	Silt loam, silt	CL, CL-ML, ML	A-4, A-6	0	100	100	100	85-100	20-35	NP-15

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
965D2:											
Bold	0-7	Silt loam	ML, CL, CL-ML	A-4, A-6	0	100	100	100	90-100	20-35	3-15
	7-60	Silt loam	ML, CL, CL-ML	A-4, A-6	0	100	100	100	90-100	20-35	3-15
1070 Beaucoup	0-19	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-25
	19-35	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-30
	35-60	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-6, A-4	0	100	100	90-100	60-95	20-40	5-20
1166 Cohoctah	0-14	Loam	ML, CL, CL-ML	A-4	0	100	100	85-95	50-85	<30	NP-10
	14-36	Loam, fine sandy loam, sandy loam.	ML, SM, SC, CL	A-4, A-2	0	95-100	85-100	70-90	30-70	<30	NP-10
	36-60	Loam, sandy loam, loamy fine sand.	ML, SM, SC, CL	A-4, A-2	0	95-100	85-100	65-90	20-70	<30	NP-10
1201 Gilford	0-16	Sandy loam	SM, SC, SC-SM	A-4, A-2-4	0	95-100	95-100	60-80	30-45	<25	2-10
	16-40	Sandy loam, fine sandy loam.	SM, SC, SC-SM	A-2-4	0	95-100	95-100	55-70	20-35	15-30	NP-8
	40-60	Sand, coarse sand, loamy sand.	SP, SP-SM, SM	A-1-b, A-2-4, A-3	0	95-100	95-100	15-60	3-20	---	NP
3088B Sparta	0-22	Loamy sand	SM	A-2, A-4	0	85-100	85-100	50-95	15-50	---	NP
	22-39	Loamy fine sand, fine sand, sand.	SP-SM, SM	A-2, A-3, A-4	0	85-100	85-100	50-95	5-50	---	NP
	39-60	Sand, fine sand	SP-SM, SM, SP	A-2, A-3	0	85-100	85-100	50-95	2-30	---	NP
3107 Sawmill	0-17	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	17-32	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	32-60	Silty clay loam, clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	85-100	70-95	25-50	8-25
3107+ Sawmill	0-12	Silt loam	CL	A-6	0	100	100	80-100	75-95	25-40	10-20
	12-38	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	38-60	Silty clay loam, clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	85-100	70-95	25-50	8-25
3115 Dockery	0-9	Silty clay loam	CL	A-6	0	100	100	90-100	85-100	35-40	15-20
	9-60	Silt loam, silty clay loam.	CL	A-4, A-6	0	100	100	90-100	85-95	25-40	8-20
3284 Tice	0-14	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	90-100	80-95	30-45	10-20
	14-44	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	85-95	40-55	15-30
	44-60	Stratified silty clay loam to loam.	CL-ML, CL	A-4, A-6, A-7	0	100	100	60-95	55-80	25-45	5-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
3302------------- Ambraw	0-23	Clay loam--------	CL	A-6, A-7	0	100	100	85-95	70-95	30-45	10-20
	23-46	Clay loam, sandy clay loam.	CL	A-7, A-6	0	100	90-100	85-95	50-85	30-50	10-25
	46-60	Stratified silty clay loam to sandy loam.	SC, ML, CL, SM	A-6, A-4	0	100	90-100	80-90	40-80	20-40	NP-17
3304------------- Landes	0-14	Sandy loam-------	SM, SC, SC-SM	A-4, A-2-4	0	100	70-100	70-95	20-50	<25	NP-10
	14-37	Loam, very fine sandy loam, loamy fine sand.	SM, CL-ML, SC, SC-SM	A-4, A-2-4	0	100	85-100	70-100	15-60	<25	NP-10
	37-60	Stratified sand to silt loam.	SM, SP-SM, SC, SC-SM	A-4, A-2-4	0	100	85-100	70-85	10-50	<30	NP-10
3682------------- Medway	0-11	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-95	30-45	10-20
	11-42	Loam, silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	95-100	80-95	75-90	70-90	20-45	4-20
	42-60	Stratified sandy loam to silty clay loam.	ML, CL, SC-SM, SM	A-4, A-2, A-6	0	90-100	75-100	45-95	25-75	15-30	NP-15
8070------------- Beaucoup	0-17	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-25
	17-36	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-30
	36-45	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-6, A-7, A-4	0	100	100	90-100	65-95	25-45	5-25
	45-60	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-6, A-4	0	100	100	90-100	60-95	20-40	5-20
8078------------- Arenzville	0-30	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	95-100	80-95	20-30	4-10
	30-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	90-100	85-95	30-45	10-20
8088B------------ Sparta	0-23	Loamy fine sand	SM	A-2, A-4	0	85-100	85-100	50-95	15-50	---	NP
	23-42	Loamy fine sand, fine sand, sand.	SP-SM, SM	A-2, A-3, A-4	0	85-100	85-100	50-95	5-50	---	NP
	42-60	Sand, fine sand	SP-SM, SM, SP	A-2, A-3	0	85-100	85-100	50-95	2-30	---	NP
8107------------- Sawmill	0-15	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	15-26	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	26-48	Silty clay loam, clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	85-100	70-95	25-50	8-25
	48-60	Silty clay loam, clay loam, silt loam.	CL	A-4, A-6, A-7	0	100	100	75-100	65-95	20-50	8-30
8107+------------ Sawmill	0-14	Silt loam--------	CL	A-6	0	100	100	80-100	75-95	25-40	10-20
	14-47	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	47-60	Silty clay loam, clay loam, loam.	CL	A-6, A-7, A-4	0	100	100	85-100	70-95	25-50	8-25

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
8284------------- Tice	0-13	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	80-95	30-45	10-20
	13-46	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	85-95	40-55	15-30
	46-60	Stratified silty clay loam to loam.	CL-ML, CL	A-4, A-6, A-7	0	100	100	60-95	55-80	25-45	5-20
8302------------- Ambraw	0-15	Clay loam---------	CL	A-6, A-7	0	100	100	85-95	70-95	30-45	10-20
	15-38	Clay loam, sandy clay loam.	CL	A-7, A-6	0	100	90-100	85-95	50-85	30-50	10-25
	38-60	Stratified silty clay loam to sandy loam.	SC, ML, CL, SM	A-6, A-4	0	100	90-100	80-90	40-80	20-40	NP-17
8304------------- Landes	0-15	Fine sandy loam	SM, SC, SC-SM	A-4, A-2-4	0	100	70-100	70-95	20-50	<25	NP-10
	15-40	Loam, very fine sandy loam, loamy fine sand.	SM, CL-ML, SC, SC-SM	A-4, A-2-4	0	100	85-100	70-100	15-60	<25	NP-10
	40-60	Stratified sand to silt loam.	SM, SP-SM, SC, SC-SM	A-4, A-2-4	0	100	85-100	70-85	10-50	<30	NP-10
8400------------- Calco	0-14	Silt loam---------	CL, CL-ML	A-6, A-4	0	100	100	95-100	85-100	25-40	5-15
	14-37	Silty clay loam	CL, CH	A-7	0	100	100	95-100	85-100	40-60	15-30
	37-60	Silty clay loam, loam, clay loam.	CL	A-7, A-6	0	100	100	90-100	80-100	30-45	10-20
8452------------- Riley	0-11	Silt loam---------	CL	A-6	0	100	100	90-100	80-100	30-40	10-20
	11-32	Sandy clay loam, silty clay loam, silt loam.	CL, SC	A-6, A-7	0	100	75-100	65-95	40-85	35-50	15-25
	32-60	Loamy fine sand, sand, loamy sand.	SM, SC-SM, SP-SM	A-2, A-4	0	100	100	90-100	10-40	<25	NP-7

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
30G--------------- Hamburg	0-6	6-12	1.20-1.30	0.6-2.0	0.20-0.24	6.6-8.4	Low-----------	0.43	5	4L	.5-2
	6-60	6-12	1.20-1.30	0.6-2.0	0.17-0.22	7.4-8.4	Low-----------	0.43			
36A, 36B--------- Tama	0-16	24-27	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.28	4	6	3-4
	16-38	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.43			
	38-60	22-28	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
36C2------------- Tama	0-8	24-27	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.28	5-4	6	3-4
	8-30	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.43			
	30-60	22-28	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
37--------------- Worthen	0-34	15-22	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.32	5	6	3-4
	34-60	18-24	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.8	Low-----------	0.43			
43--------------- Ipava	0-8	20-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Moderate-----	0.28	5	6	4-5
	8-44	35-43	1.25-1.50	0.2-0.6	0.11-0.20	5.6-7.8	High----------	0.43			
	44-60	20-30	1.30-1.55	0.2-0.6	0.20-0.22	6.1-8.4	Moderate-----	0.43			
49--------------- Watseka	0-16	8-13	1.35-1.55	6.0-20	0.10-0.12	5.6-7.3	Low-----------	0.17	5	2	1-3
	16-60	1-10	1.50-1.70	6.0-20	0.05-0.10	5.1-7.3	Low-----------	0.17			
53B, 53D--------- Bloomfield	0-8	2-10	1.60-1.80	6.0-20	0.07-0.09	5.1-7.3	Low-----------	0.15	5	1	.5-2
	8-45	2-10	1.60-1.80	6.0-20	0.06-0.11	5.1-7.3	Low-----------	0.15			
	45-60	5-13	1.60-1.80	2.0-20	0.05-0.10	5.1-7.8	Low-----------	0.15			
54B, 54D, 54E---- Plainfield	0-9	2-5	1.50-1.65	6.0-20	0.04-0.09	4.5-7.3	Low-----------	0.15	5	1	<1
	9-31	0-4	1.50-1.65	6.0-20	0.04-0.07	4.5-7.3	Low-----------	0.17			
	31-60	0-4	1.50-1.70	6.0-20	0.04-0.07	4.5-6.5	Low-----------	0.17			
67--------------- Harpster	0-15	27-35	1.05-1.25	0.6-2.0	0.21-0.24	7.4-8.4	Moderate-----	0.28	5	4L	5-6
	15-20	27-35	1.20-1.50	0.6-2.0	0.18-0.22	7.4-8.4	Moderate-----	0.28			
	20-46	22-35	1.25-1.55	0.6-2.0	0.17-0.22	7.4-8.4	Moderate-----	0.28			
	46-60	15-30	1.40-1.60	0.6-2.0	0.11-0.22	7.4-8.4	Low-----------	0.28			
68--------------- Sable	0-16	27-35	1.15-1.35	0.6-2.0	0.21-0.23	5.6-7.3	Moderate-----	0.28	5	7	5-6
	16-46	24-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.28			
	46-60	20-28	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low-----------	0.28			
88B, 88D--------- Sparta	0-23	3-10	1.20-1.40	2.0-6.0	0.09-0.12	5.1-7.3	Low-----------	0.17	5	2	>1
	23-38	1-8	1.40-1.60	6.0-20	0.05-0.11	5.1-7.3	Low-----------	0.17			
	38-60	0-5	1.50-1.70	6.0-20	0.04-0.07	5.1-7.8	Low-----------	0.17			
89--------------- Maumee	0-18	2-10	1.60-1.75	6.0-20	0.10-0.12	6.1-7.3	Low-----------	0.17	5	2	2-4
	18-60	2-10	1.60-1.75	6.0-20	0.05-0.07	6.1-8.4	Low-----------	0.17			
98B-------------- Ade	0-22	3-12	1.35-1.55	6.0-20	0.10-0.12	5.1-6.5	Low-----------	0.17	5	2	3-5
	22-31	3-12	1.40-1.60	6.0-20	0.06-0.08	5.1-6.5	Low-----------	0.17			
	31-60	3-16	1.40-1.60	6.0-20	0.06-0.08	5.1-6.0	Low-----------	0.17			
100-------------- Palms	0-24	---	0.25-0.45	0.2-6.0	0.35-0.45	5.1-7.8	--------------	----	5	2	>75
	24-60	7-35	1.45-1.75	0.2-2.0	0.14-0.22	6.1-8.4	Low-----------	0.37			
103-------------- Houghton	0-60	---	0.15-0.45	0.2-6.0	0.35-0.45	5.6-7.8	--------------	----	5	2	>70

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
125-------------- Selma	0-20	27-30	1.35-1.55	0.6-2.0	0.17-0.23	6.1-7.8	Moderate-----	0.28	5	6	4-6
	20-48	18-30	1.40-1.60	0.6-2.0	0.15-0.19	6.1-8.4	Moderate-----	0.28			
	48-60	7-18	1.60-1.90	2.0-6.0	0.07-0.19	6.6-8.4	Low----------	0.28			
131A, 131B------- Alvin	0-5	10-15	1.45-1.65	2.0-6.0	0.14-0.20	4.5-7.3	Low----------	0.24	5	3	.5-1
	5-18	10-15	1.45-1.65	0.6-6.0	0.14-0.20	4.5-7.3	Low----------	0.24			
	18-45	15-18	1.45-1.65	0.6-6.0	0.12-0.20	4.5-6.0	Low----------	0.24			
	45-60	3-10	1.55-1.75	2.0-6.0	0.05-0.13	5.1-8.4	Low----------	0.24			
131C2, 131D2----- Alvin	0-9	10-15	1.45-1.65	2.0-6.0	0.14-0.20	4.5-7.3	Low----------	0.24	5	3	.5-1
	9-34	15-18	1.45-1.65	0.6-6.0	0.12-0.20	4.5-6.0	Low----------	0.24			
	34-60	3-10	1.55-1.75	2.0-6.0	0.05-0.13	5.1-8.4	Low----------	0.24			
131F------------- Alvin	0-5	10-15	1.45-1.65	2.0-6.0	0.14-0.20	4.5-7.3	Low----------	0.24	5	3	.5-1
	5-18	10-15	1.45-1.65	0.6-6.0	0.14-0.20	4.5-7.3	Low----------	0.24			
	18-45	15-18	1.45-1.65	0.6-6.0	0.12-0.20	4.5-6.0	Low----------	0.24			
	45-60	3-10	1.55-1.75	2.0-6.0	0.05-0.13	5.1-8.4	Low----------	0.24			
150A, 150B------- Onarga	0-18	8-15	1.15-1.45	0.6-6.0	0.13-0.22	5.6-7.8	Low----------	0.20	4	3	2-4
	18-33	15-18	1.45-1.70	0.6-6.0	0.15-0.19	4.5-7.3	Low----------	0.20			
	33-60	2-10	1.65-1.90	6.0-20	0.05-0.13	5.1-7.3	Low----------	0.15			
150C2------------ Onarga	0-9	8-15	1.15-1.45	0.6-6.0	0.13-0.22	5.6-7.8	Low----------	0.20	4	3	2-4
	9-38	15-18	1.45-1.70	0.6-6.0	0.15-0.19	4.5-7.3	Low----------	0.20			
	38-60	2-10	1.65-1.90	6.0-20	0.05-0.13	5.1-7.3	Low----------	0.15			
151-------------- Ridgeville	0-18	10-15	1.15-1.45	0.6-2.0	0.15-0.18	5.6-6.5	Low----------	0.20	5	3	2-4
	18-36	14-18	1.45-1.70	0.6-2.0	0.15-0.19	5.6-6.5	Low----------	0.20			
	36-60	3-10	1.55-1.90	2.0-6.0	0.09-0.13	6.6-7.8	Low----------	0.20			
152-------------- Drummer	0-19	27-35	1.10-1.30	0.6-2.0	0.21-0.23	5.6-7.8	Moderate-----	0.28	5	7	5-7
	19-41	20-35	1.20-1.45	0.6-2.0	0.21-0.24	5.6-7.8	Moderate-----	0.28			
	41-53	22-33	1.30-1.55	0.6-2.0	0.17-0.20	6.1-8.4	Moderate-----	0.28			
	53-60	15-32	1.40-1.70	0.6-2.0	0.11-0.19	6.6-8.4	Low----------	0.28			
159A, 159B------- Pillot	0-12	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-6.5	Low----------	0.32	4	6	3-4
	12-36	27-35	1.30-1.50	0.6-2.0	0.16-0.20	5.6-7.3	Moderate-----	0.43			
	36-60	2-10	1.60-1.70	2.0-20	0.05-0.13	5.6-7.3	Low----------	0.17			
159C2------------ Pillot	0-9	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-6.5	Low----------	0.32	4	6	3-4
	9-36	27-35	1.30-1.50	0.6-2.0	0.16-0.20	5.6-7.3	Moderate-----	0.43			
	36-60	2-10	1.60-1.70	2.0-20	0.05-0.13	5.6-7.3	Low----------	0.17			
198-------------- Elburn	0-19	22-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.28	5	6	4-5
	19-46	25-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.43			
	46-60	15-25	1.50-1.70	0.6-6.0	0.12-0.18	6.1-8.4	Low----------	0.43			
199A, 199B------- Plano	0-14	18-27	1.10-1.30	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.32	4	6	3-5
	14-49	25-35	1.20-1.40	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	49-60	10-20	1.51-1.70	0.6-2.0	0.11-0.22	5.6-8.4	Low----------	0.43			
200-------------- Orio	0-9	10-20	1.25-1.45	0.6-2.0	0.20-0.24	4.5-7.8	Low----------	0.28	5	5	1-2
	9-25	6-20	1.30-1.50	0.6-2.0	0.09-0.18	4.5-7.8	Low----------	0.28			
	25-47	18-30	1.40-1.60	0.2-0.6	0.12-0.19	4.5-7.8	Moderate-----	0.28			
	47-60	3-10	1.55-1.75	6.0-20	0.05-0.13	4.5-7.8	Low----------	0.28			
201-------------- Gilford	0-15	10-20	1.50-1.70	2.0-6.0	0.16-0.18	5.6-7.3	Low----------	0.20	4	3	2-4
	15-27	8-17	1.60-1.80	2.0-6.0	0.12-0.14	5.6-7.3	Low----------	0.20			
	27-36	3-12	1.70-1.90	6.0-20	0.05-0.08	6.1-7.3	Low----------	0.15			
	36-60	2-10	1.70-1.90	6.0-20	0.05-0.08	6.6-8.4	Low----------	0.15			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
206-------------- Thorp	0-11	20-27	1.15-1.35	0.2-0.6	0.22-0.24	5.1-7.8	Low-----------	0.37	5	6	4-6
	11-16	18-25	1.30-1.50	0.2-0.6	0.20-0.22	5.1-7.3	Low-----------	0.37			
	16-38	22-35	1.35-1.55	0.06-0.2	0.18-0.20	5.1-7.3	Moderate-----	0.37			
	38-49	20-30	1.40-1.60	0.06-0.2	0.15-0.22	5.6-7.8	Moderate-----	0.37			
	49-60	5-20	1.50-1.70	2.0-6.0	0.05-0.13	6.1-8.4	Low-----------	0.37			
244-------------- Hartsburg	0-16	27-33	1.15-1.35	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.28	5	7	3-5
	16-30	27-35	1.20-1.50	0.6-2.0	0.18-0.20	6.6-8.4	Moderate-----	0.28			
	30-60	20-27	1.30-1.55	0.6-2.0	0.20-0.22	7.4-8.4	Low-----------	0.28			
266-------------- Disco	0-41	8-20	1.35-1.65	2.0-6.0	0.13-0.15	5.1-6.5	Low-----------	0.20	4	3	2-3
	41-60	5-20	1.45-1.70	6.0-20	0.05-0.09	5.1-7.3	Low-----------	0.20			
271D2------------ Timula	0-22	10-18	1.30-1.60	0.6-2.0	0.20-0.24	6.1-7.8	Low-----------	0.37	4	5	1-2
	22-60	10-18	1.40-1.60	0.6-2.0	0.18-0.20	7.4-8.4	Low-----------	0.37			
272-------------- Edgington	0-17	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low-----------	0.32	4	6	3-4
	17-25	18-25	1.30-1.50	0.2-0.6	0.20-0.22	5.1-6.0	Low-----------	0.32			
	25-51	27-35	1.35-1.55	0.06-0.2	0.18-0.20	5.1-7.3	Moderate-----	0.32			
	51-60	18-27	1.50-1.70	0.2-0.6	0.20-0.22	5.6-7.3	Low-----------	0.32			
280B------------- Fayette	0-10	15-27	1.30-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low-----------	0.32	5	6	2-3
	10-46	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.43			
	46-60	22-26	1.45-1.50	0.6-2.0	0.18-0.20	5.1-7.8	Moderate-----	0.43			
280C2, 280D2----- Fayette	0-8	15-27	1.30-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low-----------	0.32	5	6	2-3
	8-44	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.43			
	44-60	22-26	1.45-1.50	0.6-2.0	0.18-0.20	5.1-7.8	Moderate-----	0.43			
280D3------------ Fayette	0-8	27-32	1.35-1.45	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43	4	7	.5-2
	8-46	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.43			
	46-60	22-26	1.45-1.50	0.6-2.0	0.18-0.20	5.1-7.8	Moderate-----	0.43			
280F------------- Fayette	0-10	15-27	1.30-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low-----------	0.32	5	6	2-3
	10-46	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.43			
	46-60	22-26	1.45-1.50	0.6-2.0	0.18-0.20	5.1-7.8	Moderate-----	0.43			
374-------------- Proctor	0-17	18-27	1.10-1.30	0.6-2.0	0.22-0.24	5.1-7.8	Low-----------	0.32	5	6	3-4
	17-30	27-35	1.35-1.55	0.6-2.0	0.15-0.20	5.6-7.3	Moderate-----	0.43			
	30-50	18-30	1.45-1.65	2.0-6.0	0.11-0.18	5.6-7.3	Low-----------	0.43			
	50-60	1-5	1.55-1.80	6.0-20	0.07-0.10	5.6-7.8	Low-----------	0.17			
379A------------- Dakota	0-18	9-20	1.45-1.55	0.6-2.0	0.12-0.18	5.1-7.3	Low-----------	0.20	4	3	2-4
	18-23	18-32	1.30-1.55	0.6-2.0	0.15-0.19	5.1-7.3	Low-----------	0.32			
	23-36	4-11	1.55-1.65	2.0-6.0	0.02-0.14	5.1-7.3	Low-----------	0.24			
	36-60	1-4	1.55-1.65	6.0-20	0.02-0.10	5.1-7.8	Low-----------	0.15			
379B------------- Dakota	0-18	9-20	1.45-1.55	0.6-2.0	0.12-0.18	5.1-7.3	Low-----------	0.20	4	3	2-4
	18-32	18-32	1.30-1.55	0.6-2.0	0.15-0.19	5.1-7.3	Low-----------	0.32			
	32-36	4-11	1.55-1.65	2.0-6.0	0.02-0.14	5.1-7.3	Low-----------	0.24			
	36-60	1-4	1.55-1.65	6.0-20	0.02-0.10	5.1-7.8	Low-----------	0.15			
430B------------- Raddle	0-15	18-24	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.32	5	6	2-4
	15-60	18-24	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.3	Low-----------	0.43			
447-------------- Canisteo	0-14	20-27	1.40-1.60	0.6-2.0	0.20-0.24	7.4-8.4	Moderate-----	0.28	5	4L	4-8
	14-48	25-35	1.35-1.50	0.6-2.0	0.15-0.19	7.4-8.4	Moderate-----	0.28			
	48-60	2-12	1.65-1.80	6.0-20	0.05-0.10	7.4-8.4	Low-----------	0.17			
683-------------- Lawndale	0-13	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.32	5	6	3-5
	13-43	25-35	1.25-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	43-60	3-10	1.50-1.85	2.0-20	0.05-0.10	5.6-7.3	Low-----------	0.15			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
684A, 684B-------- Broadwell	0-14	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.32	5	6	3-5
	14-42	24-35	1.25-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	42-60	3-10	1.20-2.00	6.0-20	0.05-0.09	5.6-7.3	Low-----------	0.15			
684C2------------- Broadwell	0-8	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.32	5	6	3-5
	8-48	24-35	1.25-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	48-60	3-10	1.20-2.00	6.0-20	0.05-0.09	5.6-7.3	Low-----------	0.15			
685C2------------- Middletown	0-7	20-27	1.20-1.40	0.6-2.0	0.22-0.24	6.1-7.3	Low-----------	0.37	5	6	1-2
	7-46	25-35	1.25-1.45	0.6-2.0	0.18-0.21	4.5-6.5	Moderate-----	0.37			
	46-60	3-10	1.70-2.00	2.0-20	0.05-0.10	5.1-7.3	Low-----------	0.17			
770--------------- Udolpho	0-14	18-27	1.30-1.40	0.6-2.0	0.19-0.22	5.6-7.3	Moderate-----	0.32	4	6	1-3
	14-27	18-30	1.35-1.45	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.32			
	27-31	10-20	1.35-1.45	0.6-2.0	0.15-0.18	5.1-6.5	Low-----------	0.24			
	31-60	2-8	1.35-1.55	6.0-20	0.05-0.10	5.1-7.3	Low-----------	0.15			
772--------------- Marshan	0-15	18-27	1.35-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low-----------	0.28	4	6	4-8
	15-38	25-35	1.40-1.55	0.6-2.0	0.17-0.22	5.6-7.3	Moderate-----	0.28			
	38-60	0-5	1.55-1.65	6.0-20	0.02-0.05	6.1-7.3	Low-----------	0.15			
965D2:											
Tallula----------	0-7	10-20	1.10-1.30	0.6-2.0	0.22-0.24	6.6-7.8	Low-----------	0.32	4	5	2-3
	7-32	12-18	1.10-1.30	0.6-2.0	0.20-0.22	6.6-7.8	Low-----------	0.43			
	32-60	8-18	1.10-1.50	0.6-2.0	0.20-0.22	7.4-8.4	Low-----------	0.43			
Bold------------	0-7	12-18	1.10-1.30	0.6-2.0	0.20-0.24	7.4-8.4	Low-----------	0.43	4	4L	.5-2
	7-60	12-18	1.10-1.30	0.6-2.0	0.20-0.24	7.4-8.4	Low-----------	0.43			
1070-------------- Beaucoup	0-19	27-35	1.25-1.45	0.2-0.6	0.21-0.23	5.6-7.8	Moderate-----	0.32	5	7	5-6
	19-35	27-35	1.30-1.50	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.32			
	35-60	10-30	1.40-1.65	0.2-0.6	0.18-0.22	6.1-8.4	Moderate-----	0.32			
1166-------------- Cohoctah	0-14	7-20	1.20-1.60	2.0-6.0	0.18-0.24	6.1-7.8	Low-----------	0.28	5	5	3-6
	14-36	5-27	1.45-1.65	2.0-6.0	0.12-0.20	6.1-8.4	Low-----------	0.28			
	36-60	2-25	1.45-1.65	2.0-6.0	0.08-0.20	6.1-8.4	Low-----------	0.28			
1201-------------- Gilford	0-16	10-20	1.50-1.70	2.0-6.0	0.16-0.18	5.6-7.3	Low-----------	0.20	4	3	2-4
	16-40	8-17	1.60-1.80	2.0-6.0	0.12-0.14	5.6-7.3	Low-----------	0.20			
	40-60	2-10	1.70-1.90	6.0-20	0.05-0.08	6.6-8.4	Low-----------	0.15			
3088B------------- Sparta	0-22	3-10	1.20-1.40	2.0-6.0	0.09-0.12	5.1-7.3	Low-----------	0.17	5	2	1-2
	22-39	1-8	1.40-1.60	6.0-20	0.05-0.11	5.1-7.3	Low-----------	0.17			
	39-60	0-5	1.50-1.70	6.0-20	0.04-0.07	5.1-7.8	Low-----------	0.17			
3107-------------- Sawmill	0-17	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28	5	7	4-5
	17-32	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28			
	32-60	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate-----	0.28			
3107+------------- Sawmill	0-12	18-27	1.25-1.40	0.6-2.0	0.22-0.24	6.1-7.8	Low-----------	0.28	5	6	4-5
	12-38	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28			
	38-60	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate-----	0.28			
3115-------------- Dockery	0-9	27-32	1.35-1.45	0.6-2.0	0.20-0.22	5.6-7.3	Moderate-----	0.37	5	7	2-4
	9-60	18-30	1.35-1.45	0.6-2.0	0.20-0.24	5.6-7.8	Moderate-----	0.37			
3284-------------- Tice	0-14	27-35	1.25-1.45	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.32	5	7	2-3
	14-44	27-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.32			
	44-60	15-30	1.40-1.60	0.6-2.0	0.11-0.18	5.6-7.8	Moderate-----	0.32			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
3302------------- Ambraw	0-23	18-35	1.40-1.60	0.6-2.0	0.17-0.22	5.6-7.3	Moderate-----	0.28	5	6	2-3
	23-46	24-35	1.45-1.65	0.2-2.0	0.15-0.19	5.1-7.3	Moderate-----	0.32			
	46-60	18-30	1.50-1.70	0.2-2.0	0.11-0.22	6.1-8.4	Low----------	0.43			
3304------------- Landes	0-14	7-20	1.40-1.60	2.0-6.0	0.13-0.20	5.6-8.4	Low----------	0.20	4	3	1-2
	14-37	5-18	1.60-1.70	2.0-6.0	0.10-0.15	5.6-8.4	Low----------	0.32			
	37-60	5-18	1.60-1.80	6.0-20	0.05-0.15	5.6-8.4	Low----------	0.20			
3682------------- Medway	0-11	27-32	1.25-1.50	0.6-2.0	0.20-0.23	6.1-7.8	Low----------	0.28	5	7	3-6
	11-42	18-32	1.20-1.50	0.6-2.0	0.14-0.18	6.1-8.4	Low----------	0.32			
	42-60	5-30	1.20-1.60	0.6-6.0	0.11-0.15	6.1-8.4	Low----------	0.32			
8070------------- Beaucoup	0-17	27-35	1.25-1.45	0.2-0.6	0.21-0.23	5.6-7.8	Moderate-----	0.32	5	7	5-6
	17-36	27-35	1.30-1.50	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.32			
	36-45	15-30	1.35-1.55	0.2-0.6	0.18-0.22	5.6-7.8	Moderate-----	0.32			
	45-60	10-30	1.40-1.65	0.2-0.6	0.18-0.22	6.1-8.4	Moderate-----	0.32			
8078------------- Arenzville	0-30	10-18	1.20-1.55	0.6-2.0	0.20-0.24	5.6-7.8	Low----------	0.37	5	5	1-3
	30-60	10-30	1.25-1.45	0.6-2.0	0.18-0.22	5.6-7.8	Moderate-----	0.37			
8088B------------ Sparta	0-23	3-10	1.20-1.40	2.0-6.0	0.09-0.12	5.1-7.3	Low----------	0.17	5	2	1-2
	23-42	1-8	1.40-1.60	6.0-20	0.05-0.11	5.1-7.3	Low----------	0.17			
	42-60	0-5	1.50-1.70	6.0-20	0.04-0.07	5.1-7.8	Low----------	0.17			
8107------------- Sawmill	0-15	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28	5	7	4-5
	15-26	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28			
	26-48	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate-----	0.28			
	48-60	18-35	1.35-1.50	0.6-2.0	0.15-0.19	6.1-8.4	Moderate-----	0.28			
8107+------------ Sawmill	0-14	18-27	1.25-1.40	0.6-2.0	0.22-0.24	6.1-7.8	Low----------	0.28	5	6	4-5
	14-47	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate-----	0.28			
	47-60	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate-----	0.28			
8284------------- Tice	0-13	27-35	1.25-1.45	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.32	5	7	2-3
	13-46	27-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.32			
	46-60	15-30	1.40-1.60	0.6-2.0	0.11-0.18	5.6-7.8	Moderate-----	0.32			
8302------------- Ambraw	0-15	18-35	1.40-1.60	0.6-2.0	0.17-0.22	5.6-7.3	Moderate-----	0.28	5	6	2-3
	15-38	24-35	1.45-1.65	0.2-2.0	0.15-0.19	5.1-7.3	Moderate-----	0.32			
	38-60	18-30	1.50-1.70	0.2-2.0	0.11-0.22	6.1-8.4	Low----------	0.43			
8304------------- Landes	0-15	7-20	1.40-1.60	2.0-6.0	0.13-0.20	5.6-8.4	Low----------	0.20	4	3	1-2
	15-40	5-18	1.60-1.70	2.0-6.0	0.10-0.15	5.6-8.4	Low----------	0.32			
	40-60	5-18	1.60-1.80	6.0-20	0.05-0.15	5.6-8.4	Low----------	0.20			
8400------------- Calco	0-14	24-27	1.25-1.30	0.6-2.0	0.21-0.23	7.4-8.4	Low----------	0.28	5	4L	5-7
	14-37	30-35	1.25-1.30	0.6-2.0	0.21-0.23	7.4-8.4	High---------	0.28			
	37-60	22-32	1.30-1.45	0.6-2.0	0.18-0.20	7.4-8.4	Moderate-----	0.32			
8452------------- Riley	0-11	24-27	1.20-1.40	0.6-2.0	0.18-0.24	5.6-7.8	Moderate-----	0.28	4	6	3-4
	11-32	24-35	1.25-1.45	0.6-2.0	0.16-0.20	5.6-7.8	Moderate-----	0.28			
	32-60	2-10	1.65-1.80	6.0-20	0.05-0.10	6.6-8.4	Low----------	0.17			

TABLE 17.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "frequent," "brief," and "apparent" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Total sub-sid-ence	Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months			Uncoated steel	Concrete
					Ft			In			
30G Hamburg	B	None	---	---	>6.0	---	---	---	High	Low	Low.
36A, 36B, 36C2 Tama	B	None	---	---	>6.0	---	---	---	High	Moderate	Moderate.
37 Worthen	B	None	---	---	>6.0	---	---	---	High	Low	Low.
43 Ipava	B	None	---	---	1.0-3.0	Apparent	Mar-Jun	---	High	High	Moderate.
49 Watseka	B	None	---	---	1.0-3.0	Apparent	Feb-May	---	Moderate	Low	High.
53B, 53D Bloomfield	A	None	---	---	>6.0	---	---	---	Low	Low	High.
54B, 54D, 54E Plainfield	A	None	---	---	>6.0	---	---	---	Low	Low	High.
67 Harpster	B/D	None	---	---	+.5-2.0	Apparent	Feb-Jun	---	High	High	Low.
68 Sable	B/D	None	---	---	+.5-2.0	Apparent	Feb-Jun	---	High	High	Low.
88B, 88D Sparta	A	None	---	---	>6.0	---	---	---	Low	Low	Moderate.
89 Maumee	A/D	None	---	---	+.5-1.0	Apparent	Dec-May	---	Moderate	High	Moderate.
98B Ade	A	None	---	---	>6.0	---	---	---	Low	Low	High.
100 Palms	A/D	None	---	---	+1-1.0	Apparent	Nov-May	25-32	High	High	Moderate.
103 Houghton	A/D	None	---	---	+1-1.0	Apparent	Nov-May	55-60	High	High	Low.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Total subsidence	Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months			Uncoated steel	Concrete
					Ft			In			
125------------- Selma	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	---	High-----	High-----	Low.
131A, 131B, 131C2, 131D2, 131F----------- Alvin	B	None---------	---	---	>6.0	---	---	---	Moderate	Low------	High.
150A, 150B, 150C2---------- Onarga	B	None---------	---	---	>6.0	---	---	---	Moderate	Low------	High.
151------------- Ridgeville	B	None---------	---	---	1.0-3.0	Apparent	Feb-May	---	High-----	Moderate	Moderate.
152------------- Drummer	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	---	High-----	High-----	Moderate.
153------------- Pella	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	---	High-----	High-----	Low.
159A, 159B, 159C2---------- Pillot	B	None---------	---	---	>6.0	---	---	---	High-----	Moderate	Moderate.
198------------- Elburn	B	None---------	---	---	1.0-3.0	Apparent	Jan-May	---	High-----	High-----	Moderate.
199A, 199B------ Plano	B	None---------	---	---	>6.0	---	---	---	High-----	Moderate	Low.
200------------- Orio	B/D	None---------	---	---	+.5-1.0	Apparent	Mar-Jun	---	High-----	High-----	Moderate.
201------------- Gilford	B/D	None---------	---	---	+.5-1.0	Apparent	Mar-Jun	---	High-----	High-----	Moderate.
206------------- Thorp	C/D	None---------	---	---	+.5-2.0	Apparent	Feb-Jun	---	High-----	High-----	Moderate.
244------------- Hartsburg	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	---	High-----	High-----	Low.
266------------- Disco	B	None---------	---	---	>6.0	---	---	---	Moderate	Low------	High.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Total subsidence	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
271D2----------- Timula	B	None---------	---	---	>6.0	---	---	---	High-----	Low------	Low.
272------------- Edgington	C/D	None---------	---	---	+.5-2.0	Apparent	Feb-Jun	---	High-----	High-----	Moderate.
280B, 280C2, 280D2, 280D3, 280F----------- Fayette	B	None---------	---	---	>6.0	---	---	---	High-----	Moderate	Moderate.
374------------- Proctor	B	None---------	---	---	>6.0	---	---	---	High-----	Moderate	Moderate.
379A, 379B------ Dakota	B	None---------	---	---	>6.0	---	---	---	Moderate	Low------	Moderate.
430B------------ Raddle	B	None---------	---	---	>6.0	---	---	---	High-----	Moderate	Moderate.
447------------- Canisteo	B/D	None---------	---	---	0-1.0	Apparent	Mar-Jun	---	High-----	High-----	Low.
683------------- Lawndale	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	---	High-----	High-----	Moderate.
684A, 684B, 684C2---------- Broadwell	B	None---------	---	---	>6.0	---	---	---	High-----	Moderate	Moderate.
685C2----------- Middletown	B	None---------	---	---	>6.0	---	---	---	High-----	High-----	High.
770------------- Udolpho	B/D	None---------	---	---	0.5-3.0	Apparent	Nov-Jul	---	High-----	Moderate	Moderate.
772------------- Marshan	B/D	None---------	---	---	0.5-2.0	Apparent	Oct-Jun	---	High-----	High-----	Moderate.
965D2:											
Tallula---------	B	None---------	---	---	>6.0	---	---	---	High-----	Low------	Low.
Bold------------	B	None---------	---	---	>6.0	---	---	---	High-----	Low------	Low.
1070------------ Beaucoup	B/D	Frequent----	Brief or long.	Mar-Jun	+.5-2.0	Apparent	Mar-Jun	---	High-----	High-----	Low.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Total subsidence	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
1166------------ Cohoctah	B/D	Frequent----	Brief or long.	Nov-Apr	0-1.0	Apparent	Mar-Jun	---	High-----	High-----	Low.
1201------------ Gilford	B/D	None--------	---	---	+.5-1.0	Apparent	Dec-May	---	High-----	High-----	Moderate.
3088B----------- Sparta	A	Frequent----	Brief-----	Mar-Jun	>6.0	---	---	---	Low------	Low------	Moderate.
3107, 3107+----- Sawmill	B/D	Frequent----	Brief-----	Mar-Jun	0-2.0	Apparent	Mar-Jun	---	High-----	High-----	Low.
3115------------ Dockery	C	Frequent----	Long------	Mar-Jun	2.0-3.0	Apparent	Mar-Jun	---	High-----	Moderate	Low.
3284------------ Tice	B	Frequent----	Brief-----	Mar-Jun	1.5-3.0	Apparent	Mar-Jun	---	High-----	High-----	Low.
3302------------ Ambraw	B/D	Frequent----	Brief-----	Mar-Jun	0-2.0	Apparent	Mar-Jun	---	High-----	High-----	Moderate.
3304------------ Landes	B	Frequent----	Brief-----	Jan-Jun	>6.0	---	---	---	Moderate	Low------	Low.
3682------------ Medway	B	Frequent----	Brief-----	Mar-Jun	1.5-3.0	Apparent	Mar-Apr	---	High-----	High-----	Low.
8070------------ Beaucoup	B/D	Occasional	Brief-----	Mar-Jun	+.5-2.0	Apparent	Mar-Jun	---	High-----	High-----	Low.
8078------------ Arenzville	B	Occasional	Brief-----	Mar-Jun	3.0-6.0	Apparent	Mar-Jun	---	High-----	Moderate	Moderate.
8088B----------- Sparta	A	Occasional	Brief-----	Mar-Jun	>6.0	---	---	---	Low------	Low------	Moderate.
8107, 8107+----- Sawmill	B/D	Occasional	Brief-----	Mar-Jun	0-2.0	Apparent	Mar-Jun	---	High-----	High-----	Low.
8284------------ Tice	B	Occasional	Brief-----	Mar-Jun	1.5-3.0	Apparent	Mar-Jun	---	High-----	High-----	Low.
8302------------ Ambraw	B/D	Occasional	Brief-----	Mar-Jun	0-2.0	Apparent	Mar-Jun	---	High-----	High-----	Moderate.
8304------------ Landes	B	Occasional	Brief-----	Mar-Jun	>6.0	---	---	---	Moderate	Low------	Low.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Total subsidence	Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months			Uncoated steel	Concrete
					Ft			In			
8400------------ Calco	B/D	Occasional	Brief-----	Mar-Jun	0-2.0	Apparent	Mar-Jun	---	High-----	High-----	Low.
8452------------ Riley	B	Occasional	Brief-----	Mar-Jun	1.5-3.0	Apparent	Mar-Jun	---	High-----	High-----	Low.

TABLE 18.--ENGINEERING INDEX TEST DATA

(See the section "Soil Series and Their Morphology" for pedon locations. Dashes indicate that a determination could not be made. A blank indicates that the test was not made. NP means nonplastic)

Soil name, report number, horizon, and depth in inches	Classification: AASHTO	Classification: Unified	Grain-size distribution, Percentage passing sieve--: No. 4	No. 10	No. 40	No. 200	Liquid limit	Plasticity index	Moisture density: Maximum dry density	Moisture density: Optimum moisture
							Pct		Lb/ft^3	Pct
Bloomfield (85IL-125-9-1,-3,-4)										
Ap------- 0 to 8	A-3(0)	SP	100.0	99.9	89.4	7.0	---	NP	110.2	11.9
E2------- 24 to 45	A-3(0)	SP		100.0	91.1	9.8	---	NP	113.0	11.9
EB, Bt--- 45 to 60	A-2-4(0)	SP		100.0	89.9	18.7	---	NP	119.4	10.5
Broadwell (85IL-125-24-1,-4,-8)										
Ap------- 0 to 9	A-4(9)	ML		100.0	99.2	92.3	32.4	10.0	107.5	17.3
Bt2------ 23 to 29	A-6(19)	CL		100.0	99.8	98.6	40.0	17.2	103.1	20.0
2C------- 53 to 60	A-3(0)	SP		100.0	97.5	15.4	---	NP	110.7	12.7
Canisteo (85IL-125-29-1,-3,-6)										
Ap------- 0 to 10	A-6(2)	SC	100.0	99.9	96.0	43.5	28.8	11.0	113.7	14.5
Bg1------ 19 to 28	A-6(4)	SC		100.0	91.9	47.9	30.1	16.4	119.0	13.4
2Cg------ 46 to 60	A-3(0)	SP	100.0	99.9	97.9	11.4	---	NP	105.7	15.1
Dakota (85IL-125-18-1,-3,-6)										
Ap------- 0 to 9	A-4(0)	SM-SC		99.9	96.4	46.6	18.4	4.1	119.9	11.0
Bt1------ 18 to 25	A-6(6)	CL		99.9	98.1	65.2	28.5	12.4	109.5	11.0
2C------- 36 to 60	A-3(0)	SP	96.5	95.3	92.0	8.5	---	NP	109.7	13.2
Disco (84IL-125-2-1,-3,-6)										
Ap------- 0 to 11	A-4(0)	SM-SC		100.0	92.0	45.8	19.2	4.6	122.1	10.9
Bw1------ 26 to 34	A-2-4(0)	SM	100.0	99.5	90.2	34.3	17.6	3.9	111.0	12.6
C-------- 46 to 60	A-3(0)	SP	96.6	95.6	65.0	5.0	---	NP	108.1	14.3
Dockery (85IL-125-35-1,-2,-3)										
A-------- 0 to 9	A-6(17)	CL		100.0	98.9	95.3	39.2	16.5	101.0	21.3
C1------- 9 to 21	A-6(19)	CL		100.0	99.7	97.6	39.7	18.2	104.7	19.4
C2------- 21 to 60	A-6(19)	CL		100.0	99.8	96.6	38.9	18.1	104.3	16.7
Edgington (85IL-125-52-1,-4,-6)										
Ap------- 0 to 8	A-4(8)	ML		100.0	99.2	93.3	31.9	8.8	106.0	18.1
E2------- 20 to 28	A-4(0)	CL	100.0	99.5	94.3	86.1	21.6	1.7	108.9	15.5
Btg1----- 33 to 40	A-7-6(19)	CL		100.0	99.3	94.3	40.2	18.9	102.8	19.7

TABLE 18.--ENGINEERING INDEX TEST DATA--Continued

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution: Percentage passing sieve--				Liquid limit	Plasticity index	Moisture density: Maximum dry density	Moisture density: Optimum moisture
	AASHTO	Unified	No. 4	No. 10	No. 40	No. 200				
							Pct		Lb/ft^3	Pct
Gilford (85IL-125-25-1,-3,-6)										
Ap------- 0 to 9	A-2-4(0)	SM		100.0	89.2	28.6	---	NP	122.8	10.7
Bg------- 15 to 27	A-2-4(0)	SM		100.0	89.1	28.3	16.1	1.9	127.1	9.7
2Cg2----- 48 to 60	A-3(0)	SP		100.0	84.3	7.4	---	NP	125.0	10.4
Marshan (85IL-125-45-1,-3,-6)										
Ap------- 0 to 9	A-6(2)	CL		100.0	96.5	50.2	25.2	10.1	112.4	14.5
Bg1------ 16 to 24	A-6(2)	SC		100.0	96.4	44.8	26.5	14.0	114.5	13.5
2Cg------ 32 to 45	A-3(0)	SP		100.0	97.1	4.6	---	NP	104.7	15.3
Plainfield (85IL-125-3-1,-3,-5)										
Ap------- 0 to 9	A-3(0)	SP		100.0	88.5	6.5	---	NP	110.7	12.1
Bw2------ 16 to 24	A-3(0)	SP		100.0	87.1	5.1	---	NP	109.2	13.2
C-------- 31 to 60	A-3(0)	SP		100.0	88.7	4.6	---	NP	107.2	12.5
Udolpho (85IL-125-16-1,-2,-3,-5)										
Ap------- 0 to 9	A-4(0)	SC		100.0	98.3	47.6	17.4	0.6	117.3	11.5
Eg------- 9 to 14	A-4(0)	SC		100.0	98.3	40.4	14.8	0.8	122.9	10.0
Btg------ 14 to 27	A-7-6(12)	CL		100.0	98.7	58.2	40.3	26.0	109.9	17.0
2Cg1----- 31 to 45	A-3(0)	SP		100.0	97.6	3.0	---	NP	109.2	13.0

TABLE 19.--CLASSIFICATION OF THE SOILS

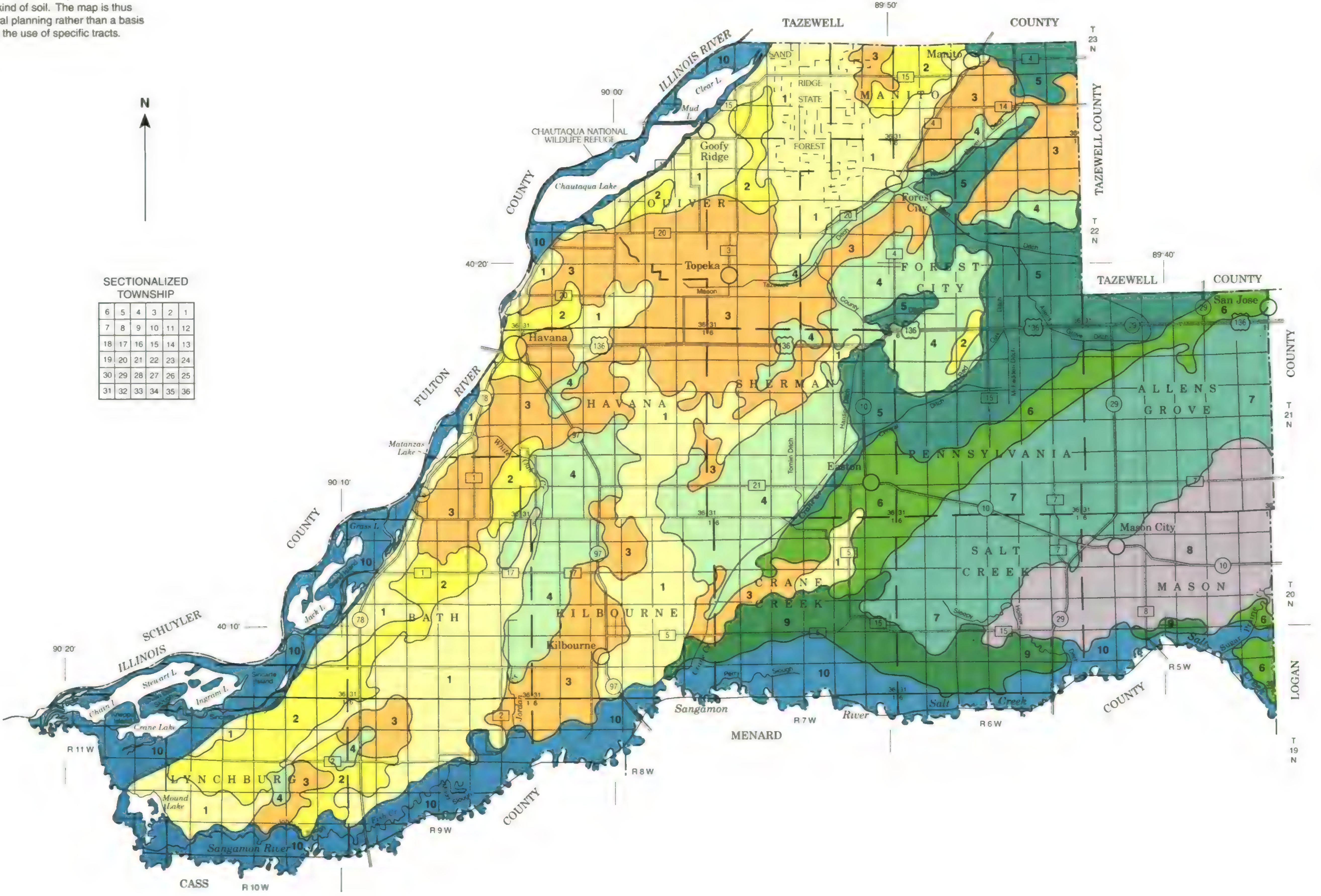
(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Ade	Coarse-loamy, mixed, mesic Psammentic Argiudolls
Alvin	Coarse-loamy, mixed, mesic Typic Hapludalfs
Ambraw	Fine-loamy, mixed, mesic Fluvaquentic Haplaquolls
Arenzville	Coarse-silty, mixed, nonacid, mesic Typic Udifluvents
Beaucoup	Fine-silty, mixed, mesic Fluvaquentic Haplaquolls
Bloomfield	Sandy, mixed, mesic Psammentic Hapludalfs
Bold	Coarse-silty, mixed (calcareous), mesic Typic Udorthents
Broadwell	Fine-silty, mixed, mesic Typic Argiudolls
Calco	Fine-silty, mixed (calcareous), mesic Cumulic Haplaquolls
Canisteo	Fine-loamy, mixed (calcareous), mesic Typic Haplaquolls
Cohoctah	Coarse-loamy, mixed, mesic Fluvaquentic Haplaquolls
Dakota	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Argiudolls
Disco	Coarse-loamy, mixed, mesic Cumulic Hapludolls
Dockery	Fine-silty, mixed, nonacid, mesic Aquic Udifluvents
Drummer	Fine-silty, mixed, mesic Typic Haplaquolls
Edgington	Fine-silty, mixed, mesic Argiaquic Argialbolls
Elburn	Fine-silty, mixed, mesic Aquic Argiudolls
Fayette	Fine-silty, mixed, mesic Typic Hapludalfs
Gilford	Coarse-loamy, mixed, mesic Typic Haplaquolls
Hamburg	Coarse-silty, mixed (calcareous), mesic Typic Udorthents
Harpster	Fine-silty, mesic Typic Calciaquolls
Hartsburg	Fine-silty, mixed, mesic Typic Haplaquolls
Houghton	Euic, mesic Typic Medisaprists
Ipava	Fine, montmorillonitic, mesic Aquic Argiudolls
Landes	Coarse-loamy, mixed, mesic Fluventic Hapludolls
Lawndale	Fine-silty, mixed, mesic Aquic Argiudolls
Marshan	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Haplaquolls
Maumee	Sandy, mixed, mesic Typic Haplaquolls
Medway	Fine-loamy, mixed, mesic Fluvaquentic Hapludolls
Middletown	Fine-silty, mixed, mesic Typic Hapludalfs
Onarga	Coarse-loamy, mixed, mesic Typic Argiudolls
Orio	Fine-loamy, mixed, mesic Mollic Ochraqualfs
Palms	Loamy, mixed, euic, mesic Terric Medisaprists
Pella	Fine-silty, mixed, mesic Typic Haplaquolls
Pillot	Fine-silty over sandy or sandy-skeletal, mixed, mesic Typic Argiudolls
Plainfield	Mixed, mesic Typic Udipsamments
Plano	Fine-silty, mixed, mesic Typic Argiudolls
Proctor	Fine-silty, mixed, mesic Typic Argiudolls
Raddle	Fine-silty, mixed, mesic Typic Hapludolls
Ridgeville	Coarse-loamy, mixed, mesic Aquic Argiudolls
Riley	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Fluvaquentic Hapludolls
Sable	Fine-silty, mixed, mesic Typic Haplaquolls
Sawmill	Fine-silty, mixed, mesic Cumulic Haplaquolls
Selma	Fine-loamy, mixed, mesic Typic Haplaquolls
*Sparta	Sandy, mixed, mesic Entic Hapludolls
*Tallula	Coarse-silty, mixed, mesic Typic Hapludolls
Tama	Fine-silty, mixed, mesic Typic Argiudolls
Thorp	Fine-silty, mixed, mesic Argiaquic Argialbolls
Tice	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Timula	Coarse-silty, mixed, mesic Typic Eutrochrepts
Udolpho	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Mollic Ochraqualfs
Watseka	Sandy, mixed, mesic Aquic Hapludolls
Worthen	Fine-silty, mixed, mesic Cumulic Hapludolls

☆ U.S. GOVERNMENT PRINTING OFFICE : 1995—386-441/20009/SCS

NRCS Accessibility Statement

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



SOIL LEGEND*

NEARLY LEVEL TO STEEP, EXCESSIVELY DRAINED TO WELL DRAINED, SANDY AND LOAMY SOILS; ON STREAM TERRACES AND DUNES

1 Plainfield-Bloomfield association

2 Sparta-Plainfield-Ade association

3 Onarga-Dakota-Sparta association

NEARLY LEVEL, POORLY DRAINED, LOAMY AND SILTY SOILS; ON STREAM TERRACES

4 Marshan-Udolpho association

5 Selma-Harpster association

NEARLY LEVEL TO SLOPING, WELL DRAINED, SOMEWHAT POORLY DRAINED, AND POORLY DRAINED, SILTY SOILS; ON UPLANDS AND STREAM TERRACES

6 Elburn-Plano-Thorp association

7 Broadwell-Edgington-Pillot association

8 Tama-Ipava association

NEARLY LEVEL TO STEEP, WELL DRAINED AND SOMEWHAT EXCESSIVELY DRAINED, SILTY, LOAMY, AND SANDY SOILS; ON UPLANDS

9 Fayette-Alvin-Bloomfield association

NEARLY LEVEL, POORLY DRAINED AND SOMEWHAT POORLY DRAINED, SILTY SOILS; ON FLOOD PLAINS

10 Beaucoup-Dockery association

* The units on this legend are described in the text under the heading "General Soil Map Units."

Compiled 1995

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
ILLINOIS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

MASON COUNTY, ILLINOIS

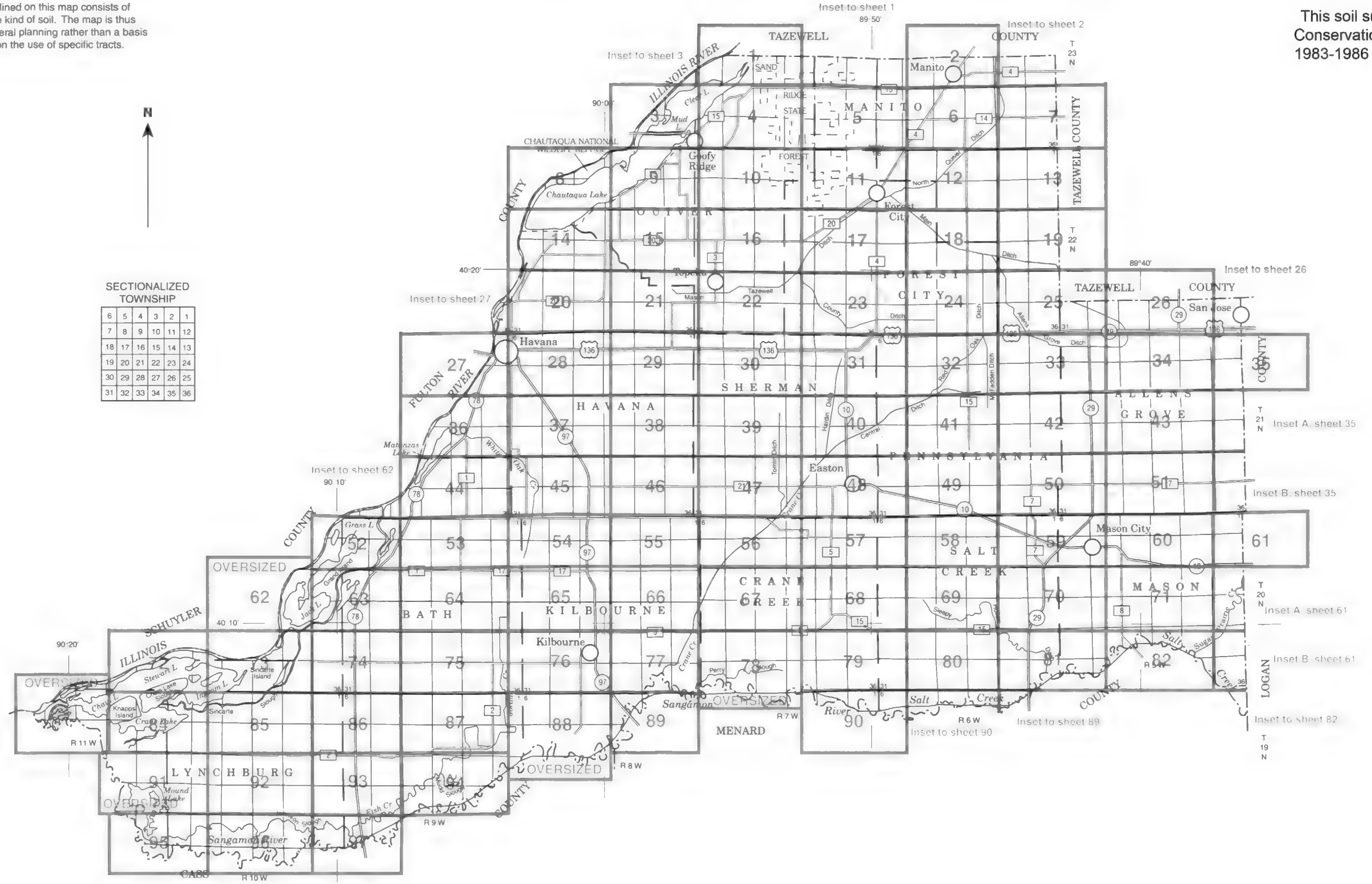
Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

Original text from each individual map sheet read:
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1983-1986 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



INDEX TO MAP SHEETS

MASON COUNTY, ILLINOIS

Scale 1:190 080

1 0 1 2 3 Miles

1 0 3 6 Km

SOIL LEGEND

Map symbols consist of numbers, or a combination of numbers and letters. The initial number represents the kind of soil. A capital letter following those numbers indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas. A final number of 2 following the slope letter indicates that the soil is moderately eroded, and 3 indicates that it is severely eroded.

SYMBOL	NAME
30G	Hamburg silt loam, 20 to 60 percent slopes
36A	Tama silt loam, 0 to 2 percent slopes
36B	Tama silt loam, 2 to 5 percent slopes
36C2	Tama silt loam, 5 to 10 percent slopes, eroded
37	Worthen silt loam
43	Ipava silt loam
49	Watseka loamy sand
53B	Bloomfield sand, 1 to 7 percent slopes
53D	Bloomfield sand, 7 to 15 percent slopes
54B	Plainfield sand, 1 to 7 percent slopes
54D	Plainfield sand, 7 to 15 percent slopes
54E	Plainfield sand, 15 to 30 percent slopes
67	Harpster silty clay loam
68	Sable silty clay loam
88B	Sparta loamy sand, 1 to 7 percent slopes
88D	Sparta loamy sand, 7 to 15 percent slopes
89	Maumee loamy sand
98B	Ade loamy fine sand, 1 to 7 percent slopes
100	Palms muck
103	Houghton muck
125	Selma clay loam
131A	Alvin fine sandy loam, 0 to 2 percent slopes
131B	Alvin fine sandy loam, 2 to 5 percent slopes
131C2	Alvin fine sandy loam, 5 to 10 percent slopes, eroded
131D2	Alvin fine sandy loam, 10 to 18 percent slopes, eroded
131F	Alvin fine sandy loam, 18 to 30 percent slopes
150A	Onarga sandy loam, 0 to 2 percent slopes
150B	Onarga sandy loam, 2 to 5 percent slopes
150C2	Onarga fine sandy loam, 5 to 10 percent slopes, eroded
151	Ridgeville sandy loam
152	Drummer silty clay loam
153	Pella silty clay loam
159A	Pillot silt loam, 0 to 2 percent slopes
159B	Pillot silt loam, 2 to 5 percent slopes
159C2	Pillot silt loam, 5 to 10 percent slopes, eroded
198	Elburn silt loam
199A	Plano silt loam, 0 to 2 percent slopes
199B	Plano silt loam, 2 to 5 percent slopes
200	Orio loam
201	Gilford sandy loam
206	Thorp silt loam
244	Hartsburg silty clay loam
266	Disco sandy loam
271D2	Timula silt loam, 10 to 18 percent slopes, eroded
272	Edgington silt loam
280B	Fayette silt loam, 1 to 5 percent slopes
280C2	Fayette silt loam, 5 to 10 percent slopes, eroded
280D2	Fayette silt loam, 10 to 18 percent slopes, eroded
280D3	Fayette silty clay loam, 7 to 15 percent slopes, severely eroded
280F	Fayette silt loam, 18 to 30 percent slopes
374	Proctor silt loam, sandy substratum
379A	Dakota fine sandy loam, 0 to 2 percent slopes
379B	Dakota fine sandy loam, 2 to 5 percent slopes
430B	Raddle silt loam, 2 to 5 percent slopes
447	Canisteo loam, sandy substratum
683	Lawndale silt loam
684A	Broadwell silt loam, 0 to 2 percent slopes
684B	Broadwell silt loam, 2 to 5 percent slopes
684C2	Broadwell silt loam, 5 to 10 percent slopes, eroded
685C2	Middletown silt loam, 5 to 10 percent slopes, eroded
770	Udolpho fine sandy loam
772	Marshan loam
965D2	Tallula-Bold complex, 7 to 15 percent slopes, eroded
1070	Beaucoup silty clay loam, wet
1166	Cohoctah loam, wet
1201	Gilford sandy loam, wet
3088B	Sparta loamy sand, 1 to 5 percent slopes, frequently flooded
3107	Sawmill silty clay loam, frequently flooded
3107+	Sawmill silt loam, overwash, frequently flooded
3115	Dockery silty clay loam, frequently flooded
3284	Tice silty clay loam, frequently flooded
3302	Ambrow clay loam, frequently flooded
3304	Landes sandy loam, frequently flooded
3682	Medway silty clay loam, frequently flooded
8070	Beaucoup silty clay loam, occasionally flooded
8078	Arenzville silt loam, occasionally flooded
8088B	Sparta loamy fine sand, 1 to 5 percent slopes, occasionally flooded
8107	Sawmill silty clay loam, occasionally flooded
8107+	Sawmill silt loam, overwash, occasionally flooded
8284	Tice silty clay loam, occasionally flooded
8302	Ambraw clay loam, occasionally flooded
8304	Landes fine sandy loam, occasionally flooded
8400	Calco silt loam, occasionally flooded
8452	Riley silt loam, occasionally flooded

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- County
- Reservation (state forest or park)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, cemetery — Davis Airstrip

STATE COORDINATE TICK — 180 000 FEET

LAND DIVISION CORNERS (sections)

ROAD EMBLEMS & DESIGNATIONS

- Federal — 136
- State — 29

LEVEES

- Without road

DAMS

- Medium or small — water, w

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Drainage ditch

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — 54B, 770

ESCARPMENTS

- Other than bedrock (points down slope)

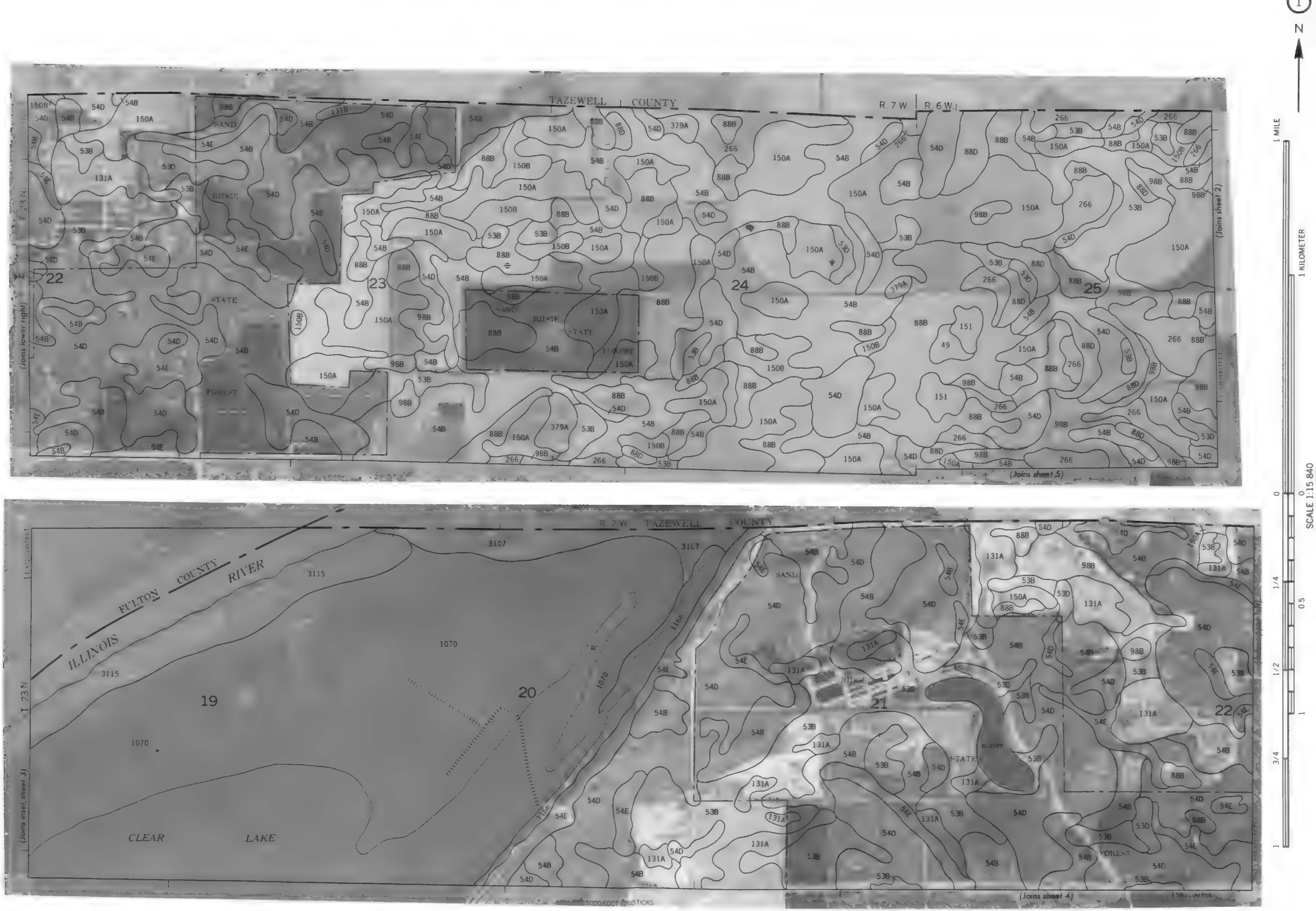
SHORT STEEP SLOPE

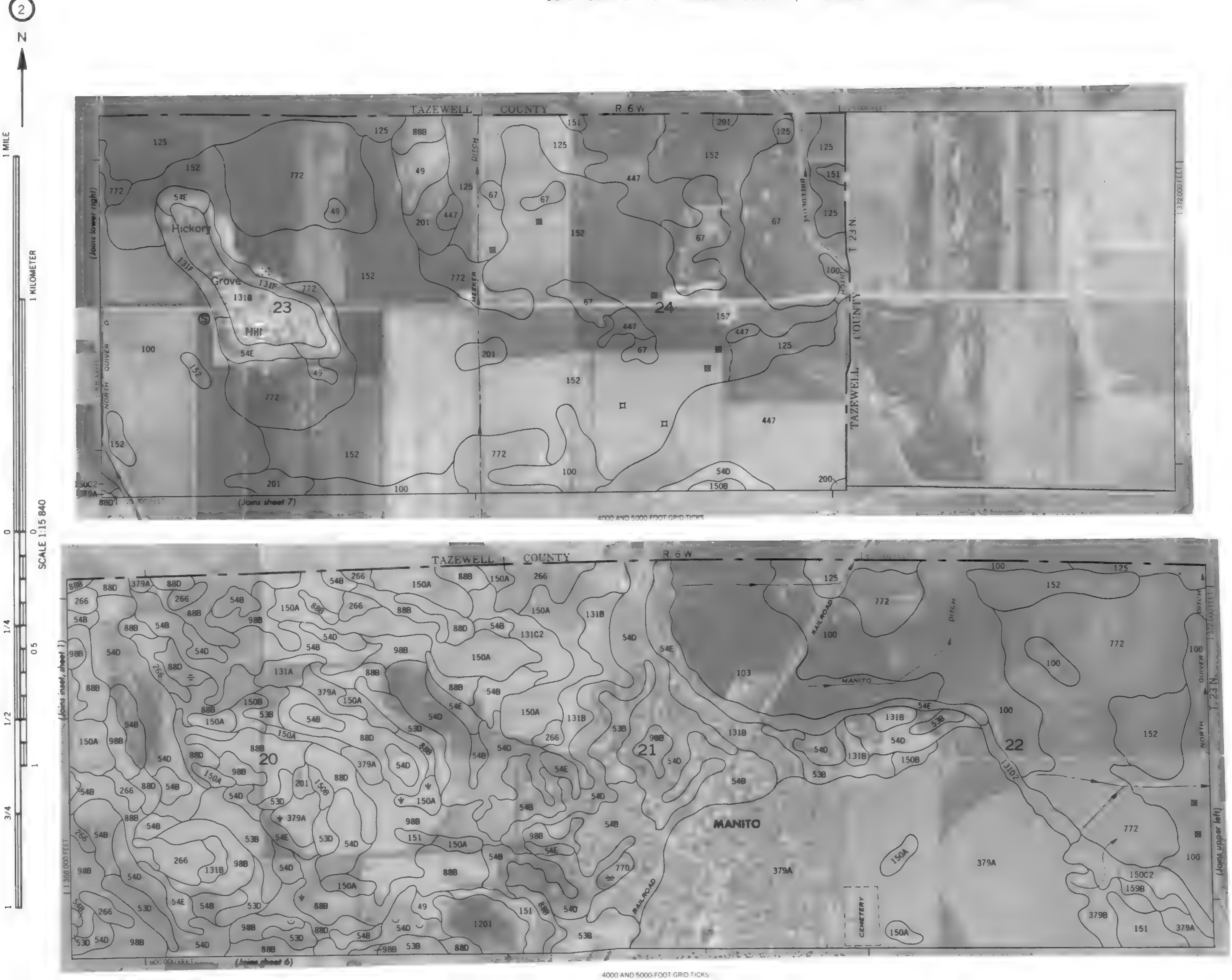
DEPRESSION OR SINK

SOIL SAMPLE SITE — S

MISCELLANEOUS

- Blowout
- Gravelly spot
- Dumps and other similar non soil areas
- Sandy spot
- Severely eroded spot
- Muck spot
- Calcareous spot
- Edgington spot
- Sand pit
- Glacial till spot


1
N
TAZEWELL COUNTY
R. 7 W.
R. 6 W.
T. 23 N.
(Joins lower right)
(Joins sheet 2)
(Joins sheet 5)
SAND
RIDGE
STATE
FOREST
22
23
24
25
R. 7 W.
TAZEWELL COUNTY
FULTON COUNTY
ILLINOIS
RIVER
CLEAR
LAKE
19
20
21
22
water
(Joins inset, sheet 3)
(Joins sheet 4)
5000-FOOT GRID TICKS
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


2
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
TAZEWELL COUNTY
R. 6 W.
T. 23 N.
TAZEWELL COUNTY
Hickory
Grove
Hill
23
24
MEEKER DITCH
BREEDLOVE DITCH
NORTH QUIVER
(Joins lower right)
(Joins sheet 7)
4000 AND 5000 FOOT GRID TICKS
TAZEWELL COUNTY
R. 6 W.
20
21
22
MANITO
RAILROAD
MANITO
DITCH
CEMETERY
NORTH QUIVER
T. 23 N.
(Joins inset, sheet 1)
(Joins upper left)
(Joins sheet 6)
4000 AND 5000-FOOT GRID TICKS

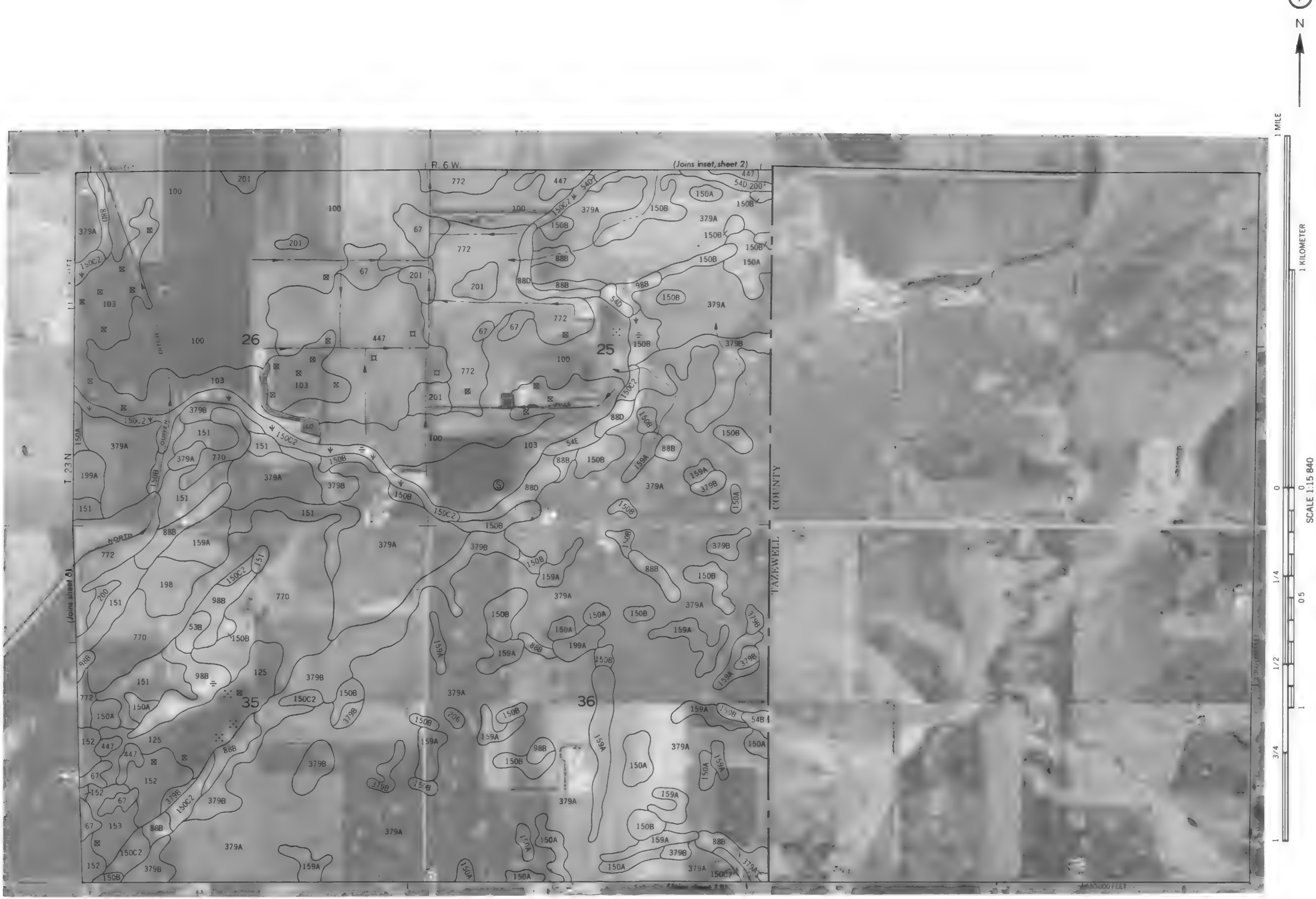

3
N
R. 8 W.
T. 23 N.
FULTON COUNTY
ILLINOIS RIVER
3115
24
1070
2000 AND 3000 FOOT GRID TICKS
(Joins inset)
25
26
35
36
CLEAR LAKE
LAKE CHAUTAUQUA
CHAUTAUQUA NATIONAL WILDLIFE REFUGE
3682
1166
54E
53D
53B
54B
54D
88B
(Joins sheet 9)
1 MILE
1 KILOMETER
SCALE 1:15 840


4
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 1)
R. 7 W.
(Joins sheet 3)
(Joins sheet 5)
(Joins sheet 10)
T. 23 N.
CLEAR
LAKE
SAND
RIDGE
STATE
FOREST
Goofy
Ridge
27
28
29
30
31
32
33
34

SOIL SURVEY OF MASON COUNTY, ILLINOIS — SHEET NUMBER 5

6


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
(Joins sheet 2)
R 6 W.
MANITO
RAILROAD
29
28
27
32
33
34
T 23 N.
(Joins sheet 7)
DITCH
QUIVER
NORTH
(sheet 11)
(Joins sheet 12)


7
N
R. 6 W.
(Joins inset, sheet 2)
(Joins sheet 6)
T. 23 N.
TAZEWELL COUNTY
26
25
35
36
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1

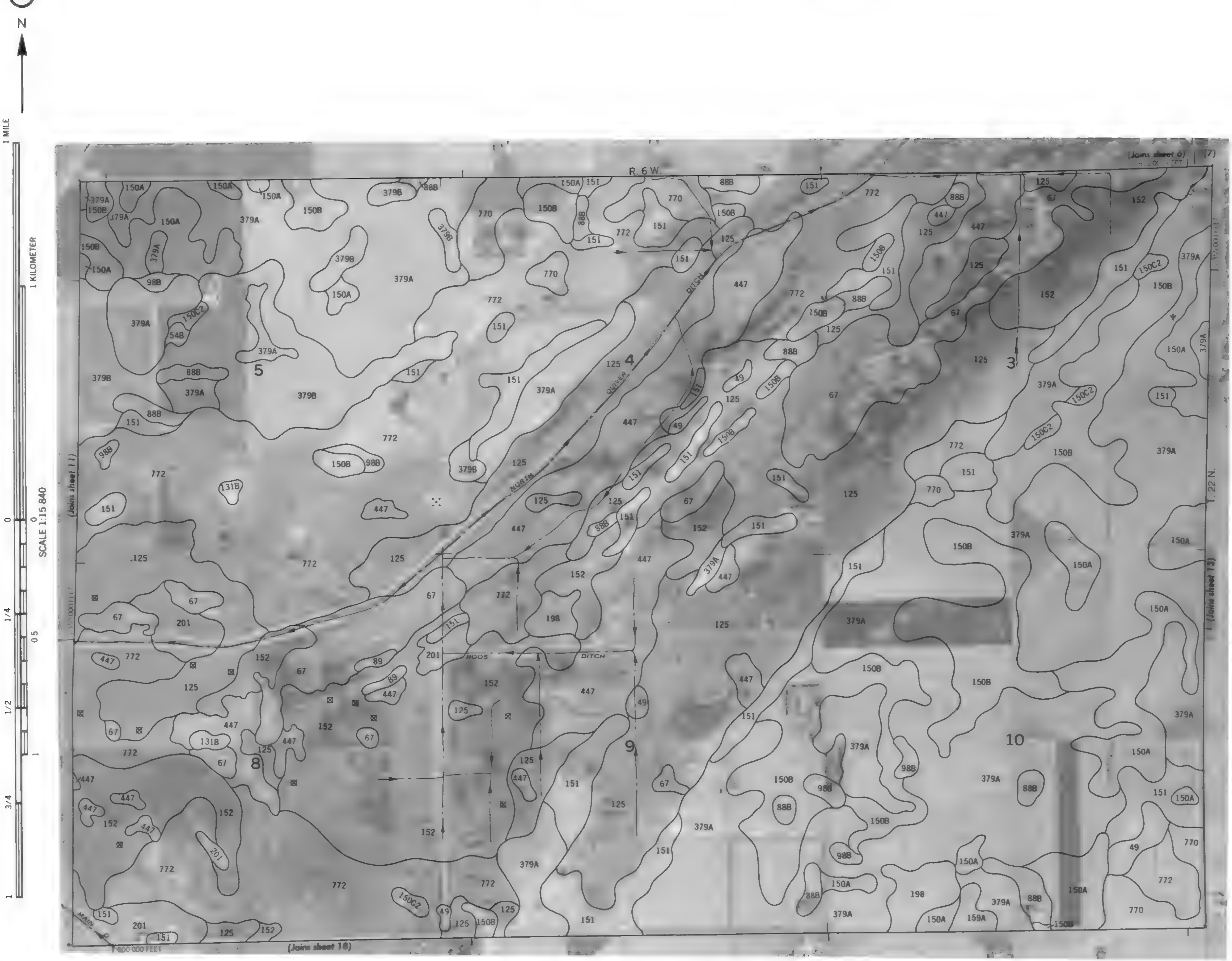

8
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
R 8 W
FULTON COUNTY
ILLINOIS RIVER
3115
1070
4
5
7
8
9
Liverpool Lake
CHAUTAUQUA NATIONAL WILDLIFE REFUGE
LAKE CHAUTAUQUA
T. 22 N.
(Joins sheet 9)
1166
53D
53B
54D
131A


9
N
R 8 W
(Joins sheet 3)
FULTON COUNTY
ILLINOIS RIVER
LAKE CHAUTAUQUA
Liverpool Lake
CHAUTAUQUA NATIONAL WILDLIFE REFUGE
T 22 N
(Joins sheet 8)
(Joins sheet 10)
(Joins sheet 15)
Buzzville
1 MILE
1 KILOMETER
SCALE 1:15 840

10


N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 4)
R. 7 W.
SAND RIDGE
STATE FOREST
SAND RIDGE
STATE FOREST
(Joins sheet 9)
(Joins sheet 11)
(Joins sheet 16)
T. 22 N.


N
(Joins sheet 5)
(sheet 6)
R. 7 W.
R. 6 W.
T. 22 N.
SAND RIDGE STATE FOREST
Forest City
NORTH QUIVER DITCH
MASON DRAINAGE DITCH
MAIN DITCH
railroad
(Joins sheet 10)
(Joins sheet 12)
(Joins sheet 17)
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1

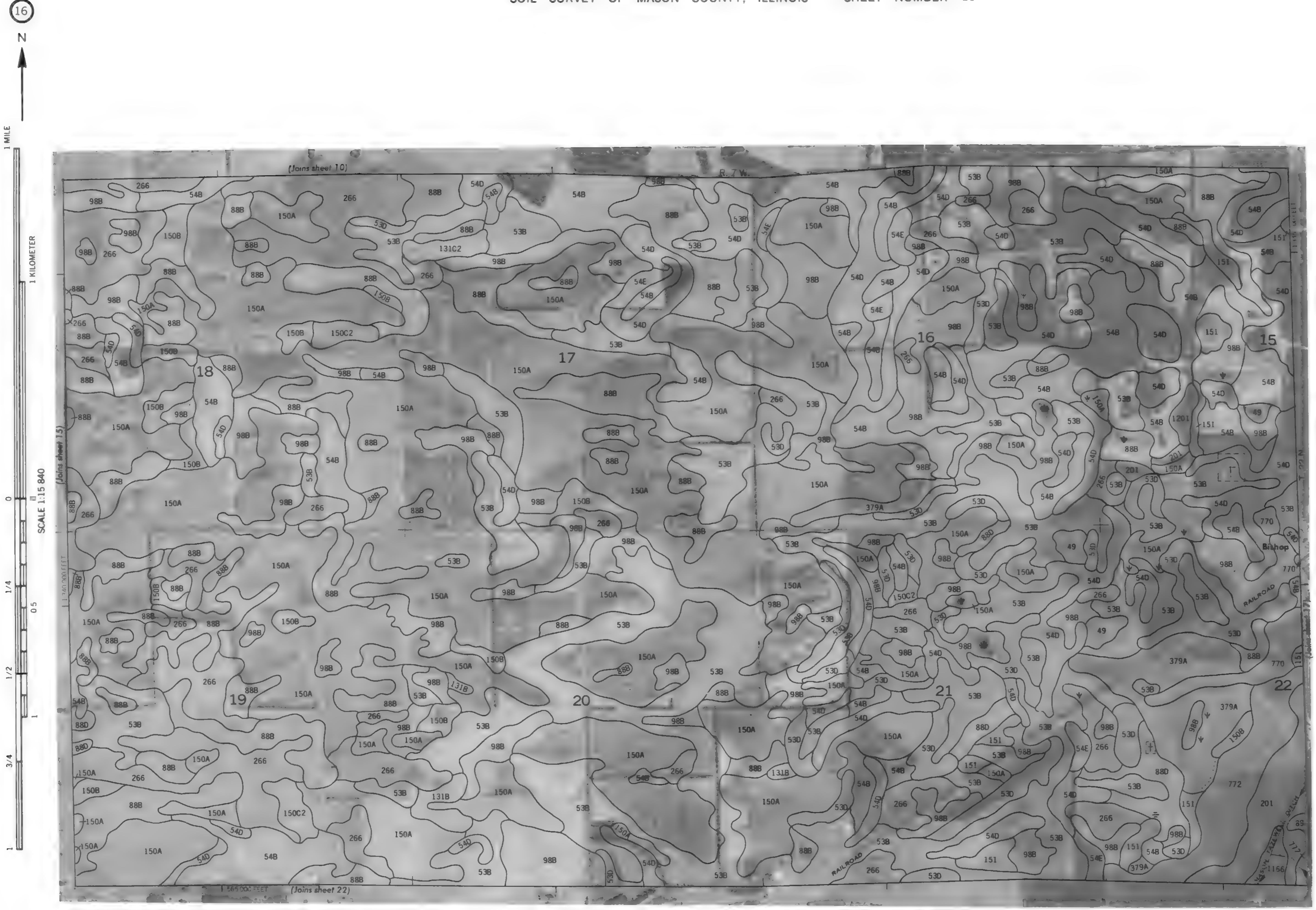

12
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
R. 6 W.
T. 22 N.
(Joins sheet 6)
(7)
(Joins sheet 11)
(Joins sheet 13)
(Joins sheet 18)
NORTH QUIVER DITCH
ROOS DITCH
MAIN
5
4
3
8
9
10

13

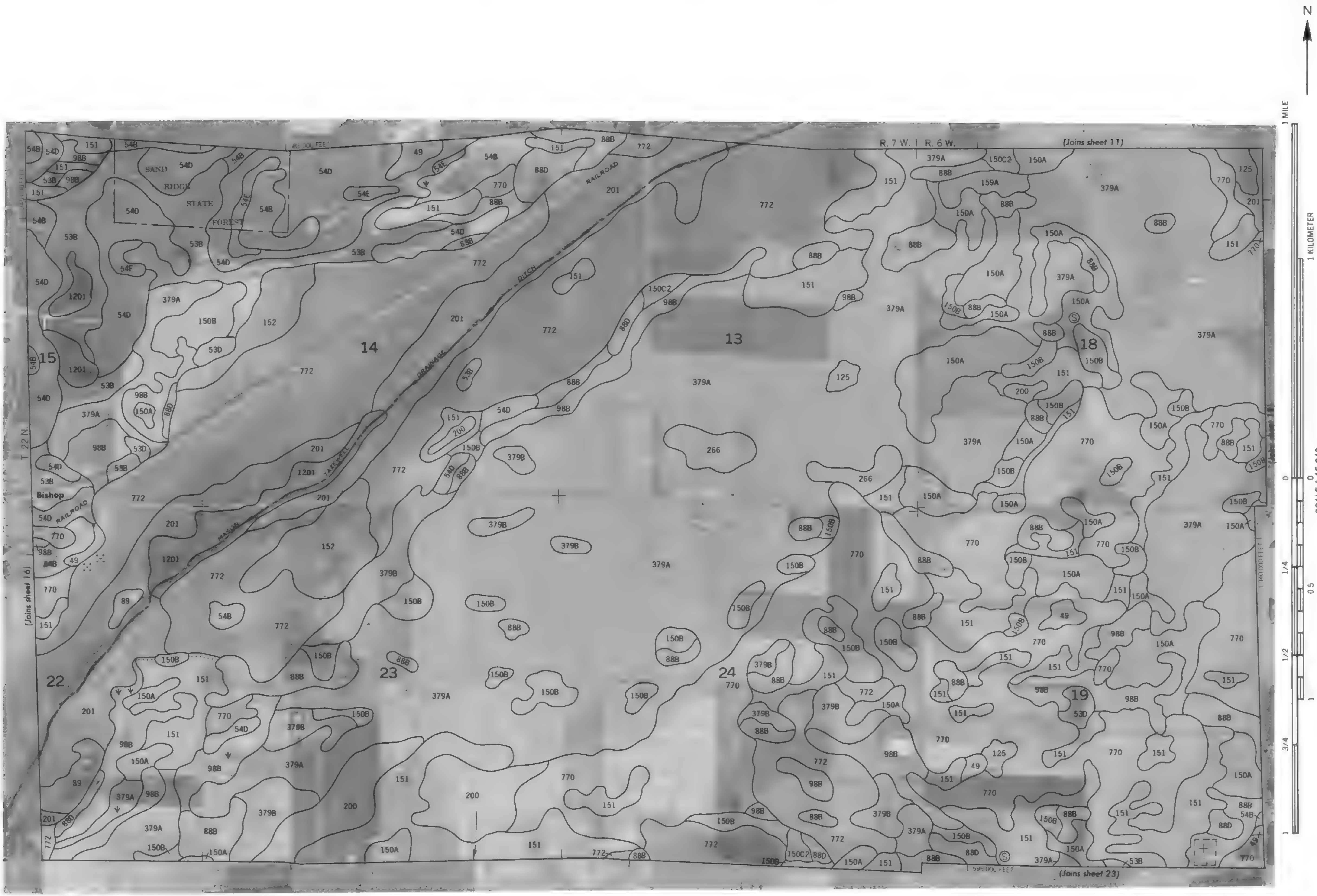

N
(Joins sheet 7)
(Joins sheet 12)
(Joins sheet 19)
T. 22 N.
TAZEWELL COUNTY
2
1
11
12
379A
150A
150B
98B
88B
159A
151
770
53B
150C2
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5

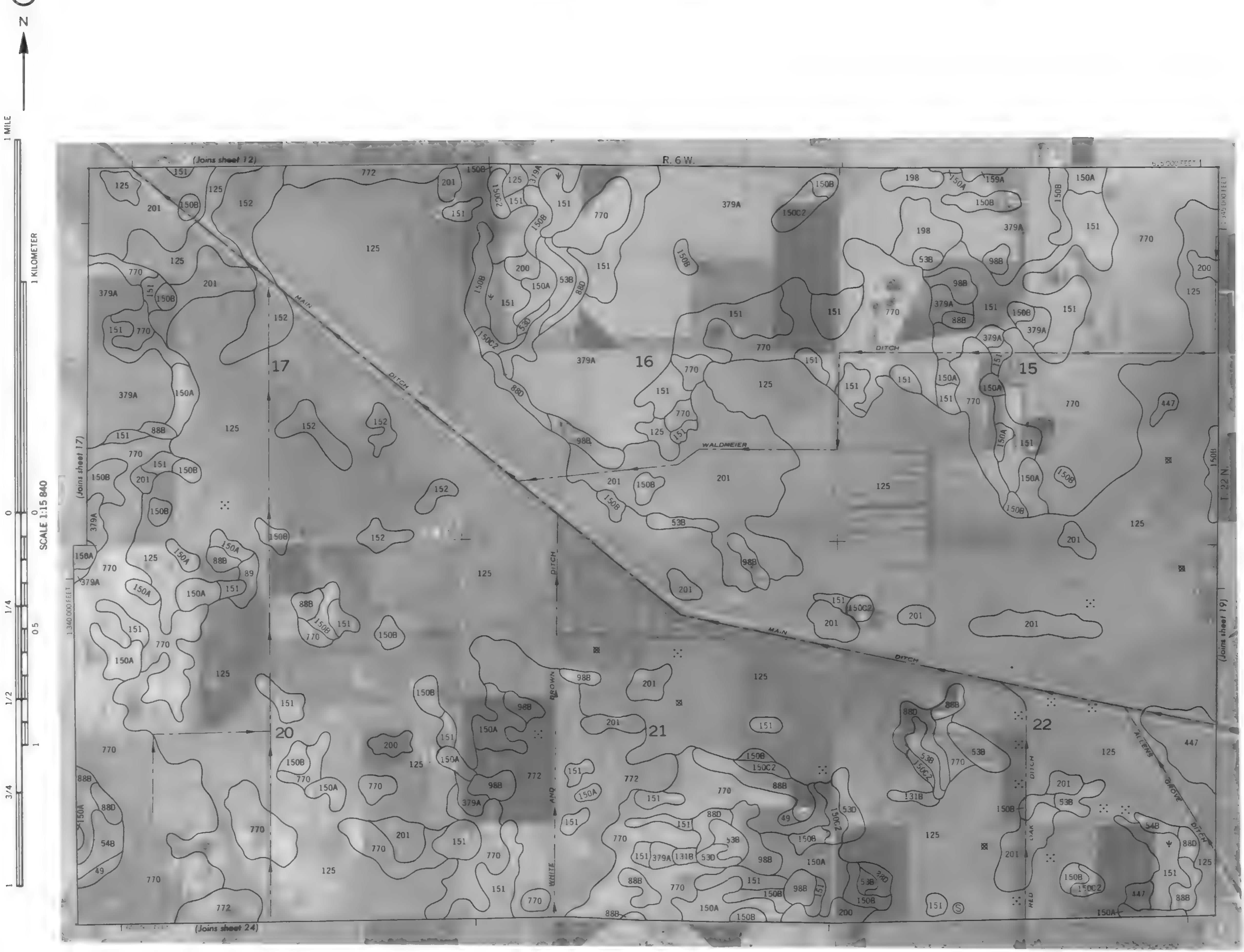

14
N
1 MILE
1 KILOMETER
SCALE 1:15 840
CHAUTAUQUA NATIONAL
LAKE CHAUTAUQUA
WILDLIFE REFUGE
ILLINOIS RIVER
FULTON COUNTY
Quiver Lake
Quiver Beach
(Joins sheet 8)
(Joins sheet 20)
R. 8 W.
18
17
16
19
20
21
Quiver Creek

SOIL SURVEY OF MASON COUNTY, ILLINOIS — SHEET NUMBER 15


16
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
0.5
1/2
1
3/4
1
(Joins sheet 10)
R. 7 W.
(Joins sheet 15)
(Joins sheet 22)
T. 22 N.
17
18
16
15
19
20
21
22
Bishop
RAILROAD
RAILROAD

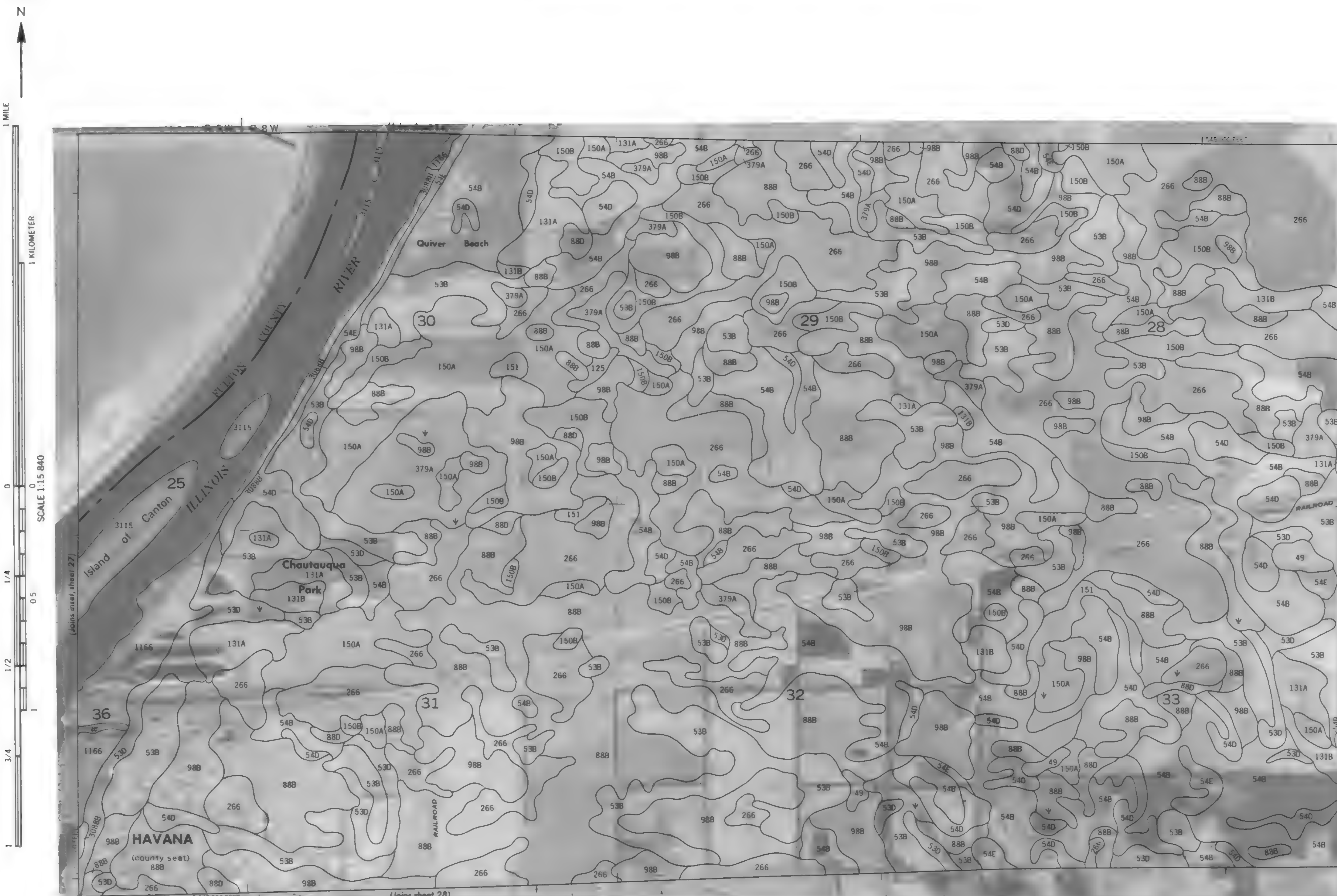
17

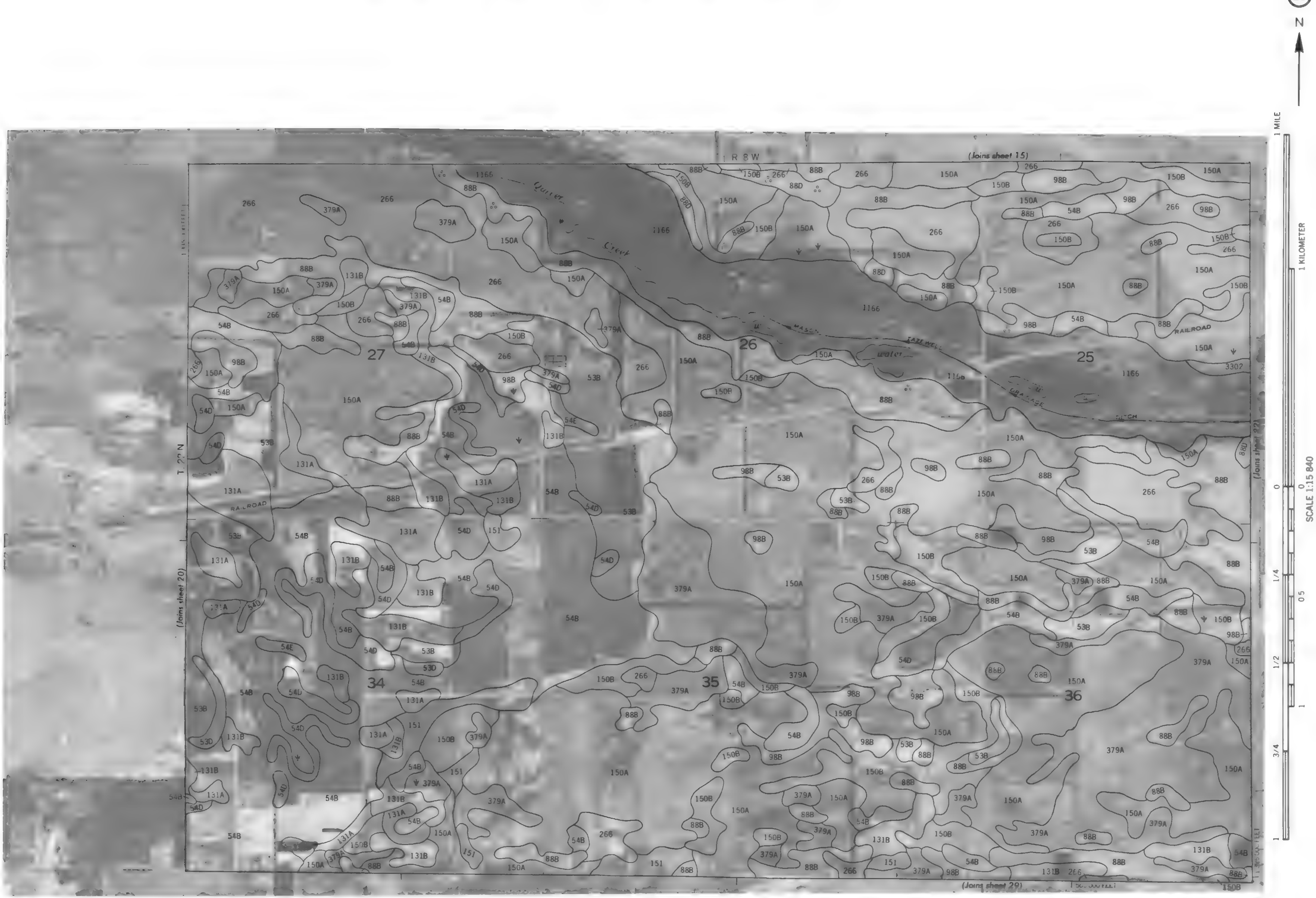

N
(Joins sheet 11)
R. 7 W. | R. 6 W.
SAND RIDGE STATE FOREST
RAILROAD
DRAINAGE DITCH
MASON TAZEWELL
Bishop
T. 22 N.
(Joins sheet 16)
(Joins sheet 23)
15
14
13
18
22
23
24
19
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 12)
R. 6 W.
(Joins sheet 17)
(Joins sheet 19)
(Joins sheet 24)
T. 22 N.
17
16
15
20
21
22
MAIN DITCH
WALDMEIER
DITCH
BROWN AND WHITE DITCH
RED OAK DITCH
ALLENS GROVE DITCH

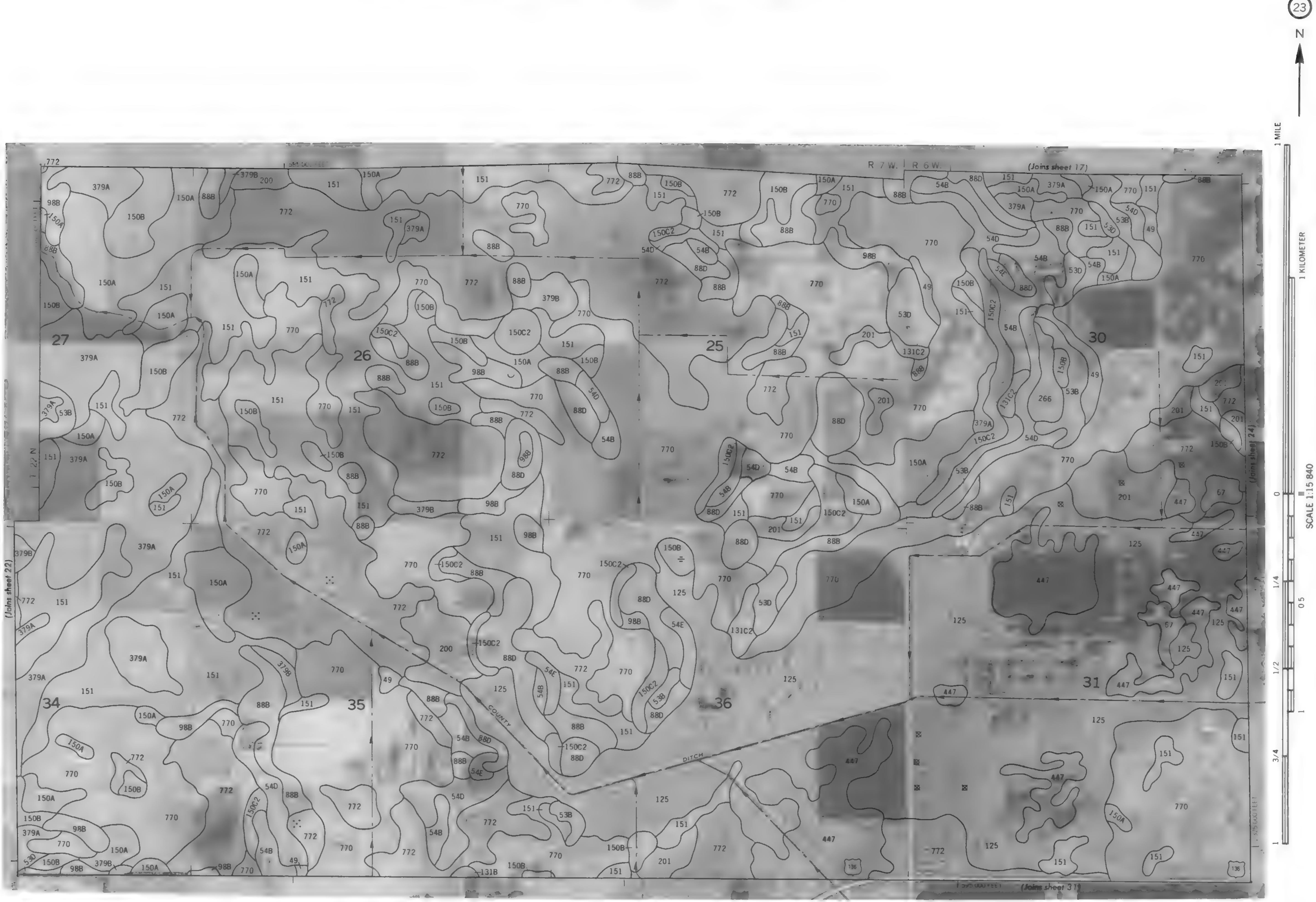

19
N
R. 6 W.
(Joins sheet 13)
(Joins sheet 18)
(Joins sheet 25)
T. 22 N.
TAZEWELL COUNTY
MAIN DITCH
14
13
23
24
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1

20


N
1 MILE
1 KILOMETER
SCALE 1:15 840
R 9 W. | R 8 W.
Quiver Beach
FULTON COUNTY
ILLINOIS RIVER
Island of Canton
Chautauqua Park
HAVANA
(county seat)
RAILROAD
25
30
29
28
36
31
32
33
(Joins inset, sheet 27)
(Joins sheet 21)
(Joins sheet 28)
530 000 FEET

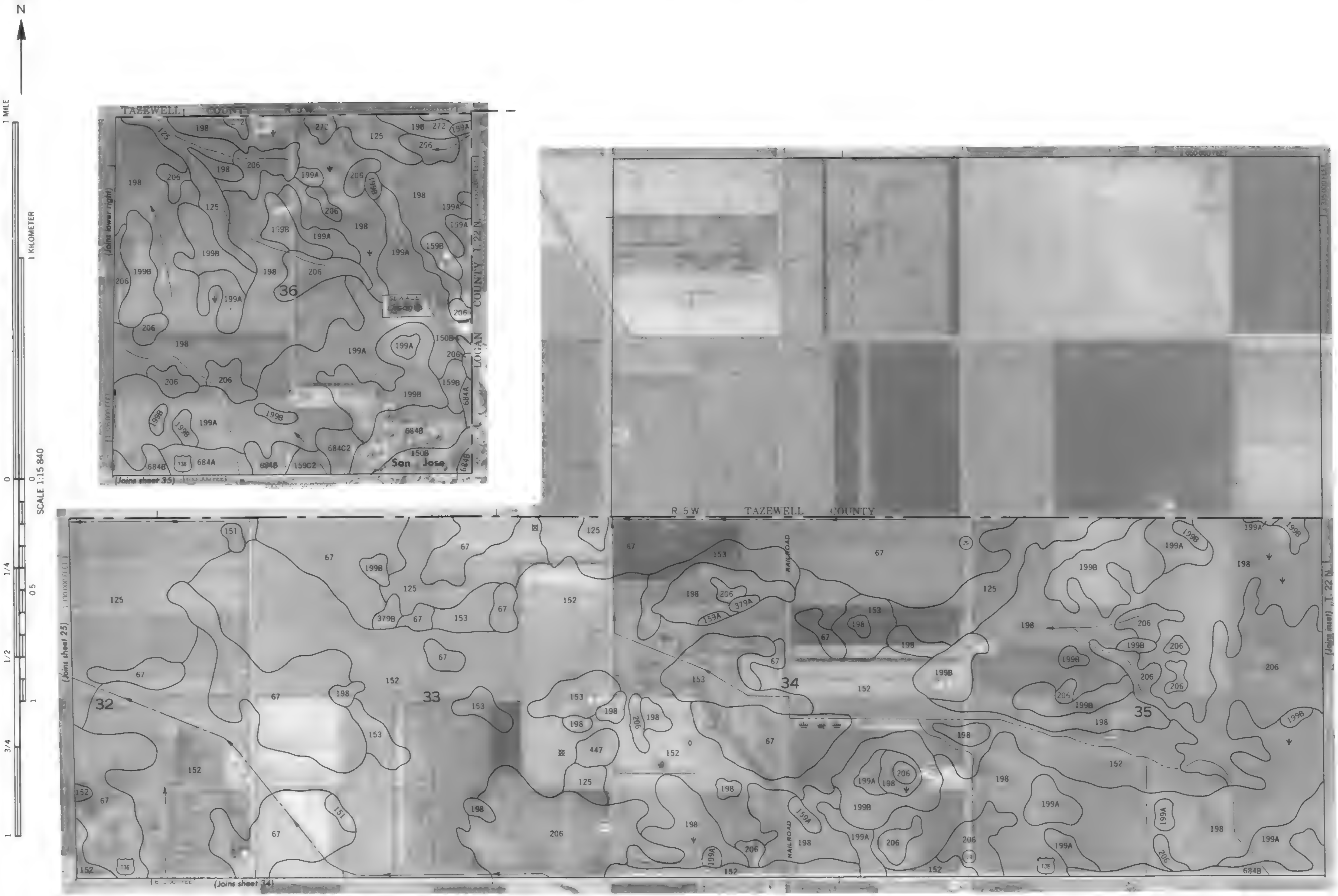

21
N
R 8 W
(Joins sheet 15)
(Joins sheet 20)
(Joins sheet 22)
(Joins sheet 29)
T. 22 N.
Quiver Creek
RAILROAD
27
26
25
34
35
36
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


22
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 16)
R. 7 W.
Topeka
RAILROAD
RAILROAD
TAZEWELL DRAINAGE DITCH
MASON
30
29
28
27
31
32
33
34
MASON STATE TREE NURSERY
T. 22 N.
(Joins sheet 21)
(Joins sheet 23)
565 000 FEET

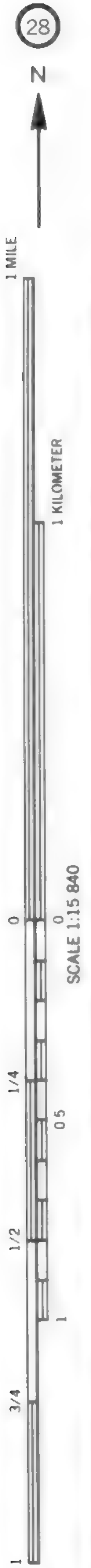

23
N
R 7 W.
R 6 W.
(Joins sheet 17)
(Joins sheet 24)
(Joins sheet 22)
(Joins sheet 31)
T 22 N
27
26
25
30
34
35
36
31
COUNTY
DITCH
136
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5

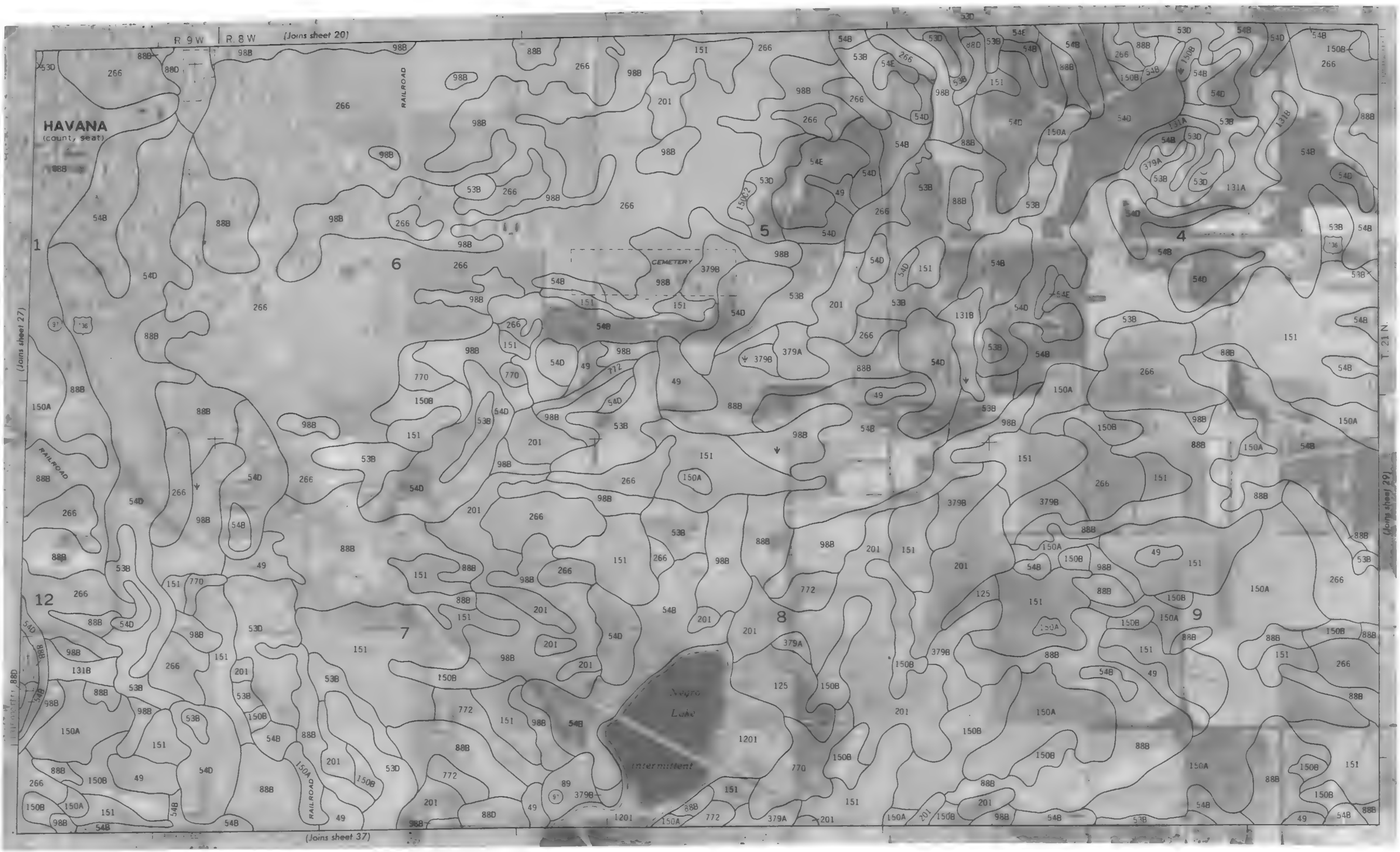

N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 18)
R 6 W
(Joins sheet 23)
(Joins sheet 25)
(Joins sheet 32)
T 22 N
29
28
27
32
33
34
COUNTY DITCH
OAK RED DITCH
1 325 000 FEET
600 000 FEET
136


25
N
(Joins sheet 19)
R 6 W. | R 5 W
(Joins sheet 24)
(Joins sheet 26)
(Joins sheet 32)
T 22 N
TAZEWELL COUNTY
TAZEWELL COUNTY
ALLENS GROVE DITCH
26
25
35
36
31
32
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
630 000 FEET
125
201
447
152
153
151
150A
150B
150C2
54B
53B
53D
54D
98B
88B
88D
770
772
49
379A
379B
131A
131B
198
200
67
159B
53D
136
29


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
TAZEWELL COUNTY
R. 5 W.
LOGAN COUNTY
T. 22 N.
(Joins lower right)
(Joins sheet 35)
San Jose
SEWAGE
36
R 5 W TAZEWELL COUNTY
(Joins sheet 25)
(Joins sheet 34)
(Joins inset)
RAILROAD
32
33
34
35
67
125
151
152
153
159A
159B
159C2
198
199A
199B
206
272
379A
379B
447
684A
684B
684C2
136


27
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins inset)
(Joins sheet 28)
(Joins sheet 36)
T. 21 N.
R. 9 W.
R. 9 W.
528 000 FEET
526 000 FEET
2000 AND 5000-FOOT GRID TICKS
ILLINOIS RIVER
FULTON COUNTY
Island of Canton
HAVANA
(county seat)
RAILROAD
1
11
12
36
3088B
53D
54E
88B
150A
98B
53B
266
54D
1166
3115
54B
88D
136
97
78


28
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1


R. 9 W.
R. 8 W.
(Joins sheet 20)
(Joins sheet 27)
(Joins sheet 29)
(Joins sheet 37)
T. 21 N.
HAVANA
(county seat)
RAILROAD
CEMETERY
Negro Lake
intermittent
1
4
5
6
7
8
9
12


N
R. 8 W.
(Joins sheet 21)
(Joins sheet 28)
(Joins sheet 30)
(Joins sheet 38)
T. 21 N.
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
1
2
3
10
11
12

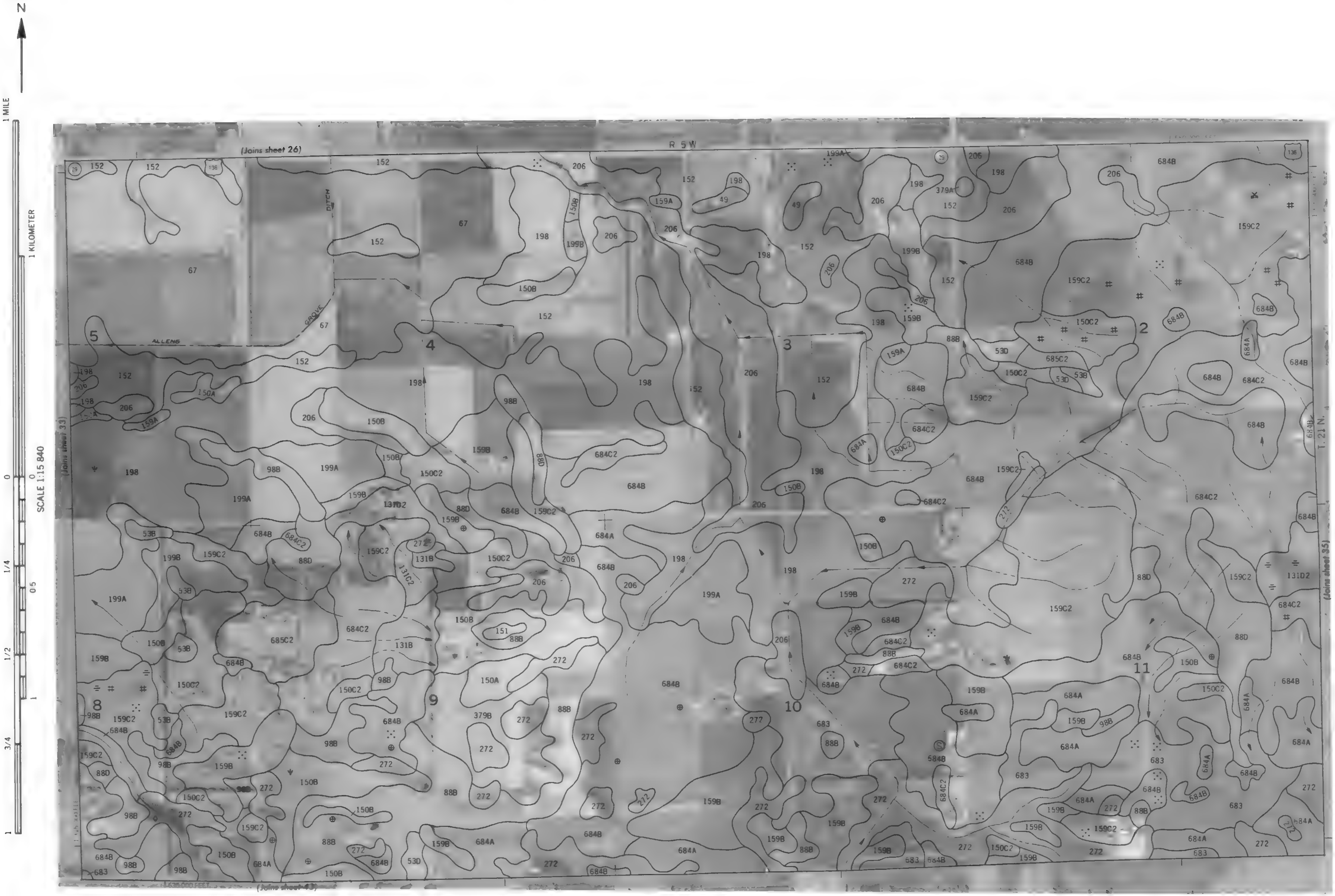

N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 22)
R. 7 W.
(Joins sheet 29)
T. 21 N.
(Joins sheet 39)
6
5
4
3
7
8
9
10


31
N
(Joins sheet 23)
R. 7 W.
R. 6 W.
T. 21 N.
(Joins sheet 30)
(Joins sheet 32)
(Joins sheet 40)
HARPIN DITCH
1 MILE
1 KILOMETER
SCALE 1:15 840

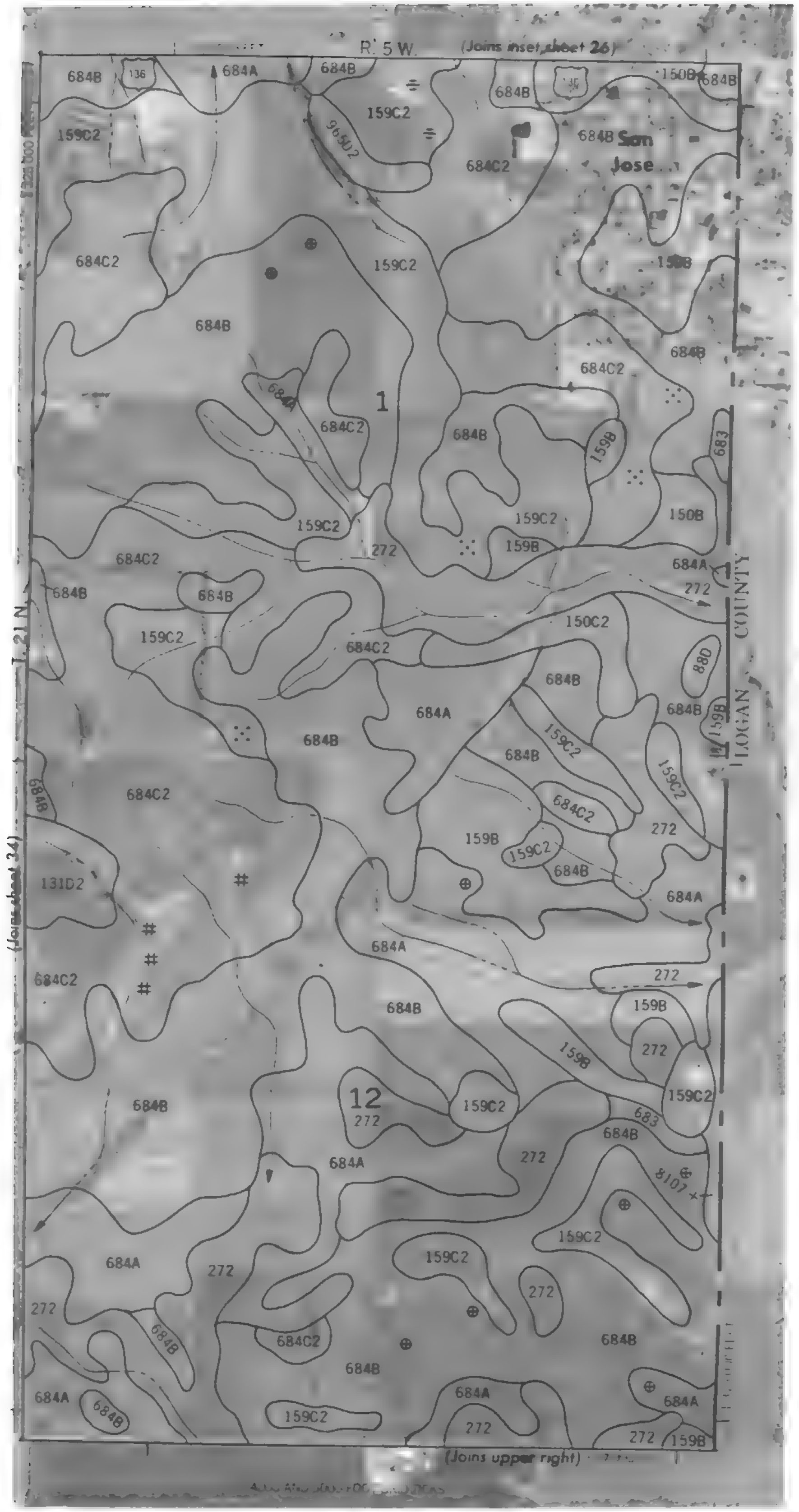

N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
0.5
1/2
3/4
1
(Joins sheet 24)
R 6 W
(Joins sheet 31)
(Joins sheet 33)
(Joins sheet 41)
T. 21 N.
600,000 FEET
5
4
3
8
9
10
OAK
RED
DITCH
CENTRAL
McFADDEN


33
N
(Joins sheet 25)
R 6 W. | R. 5 W.
ALLENS
GROVE
DITCH
(Joins sheet 32)
(Joins sheet 34)
(Joins sheet 42)
T. 21 N.
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5

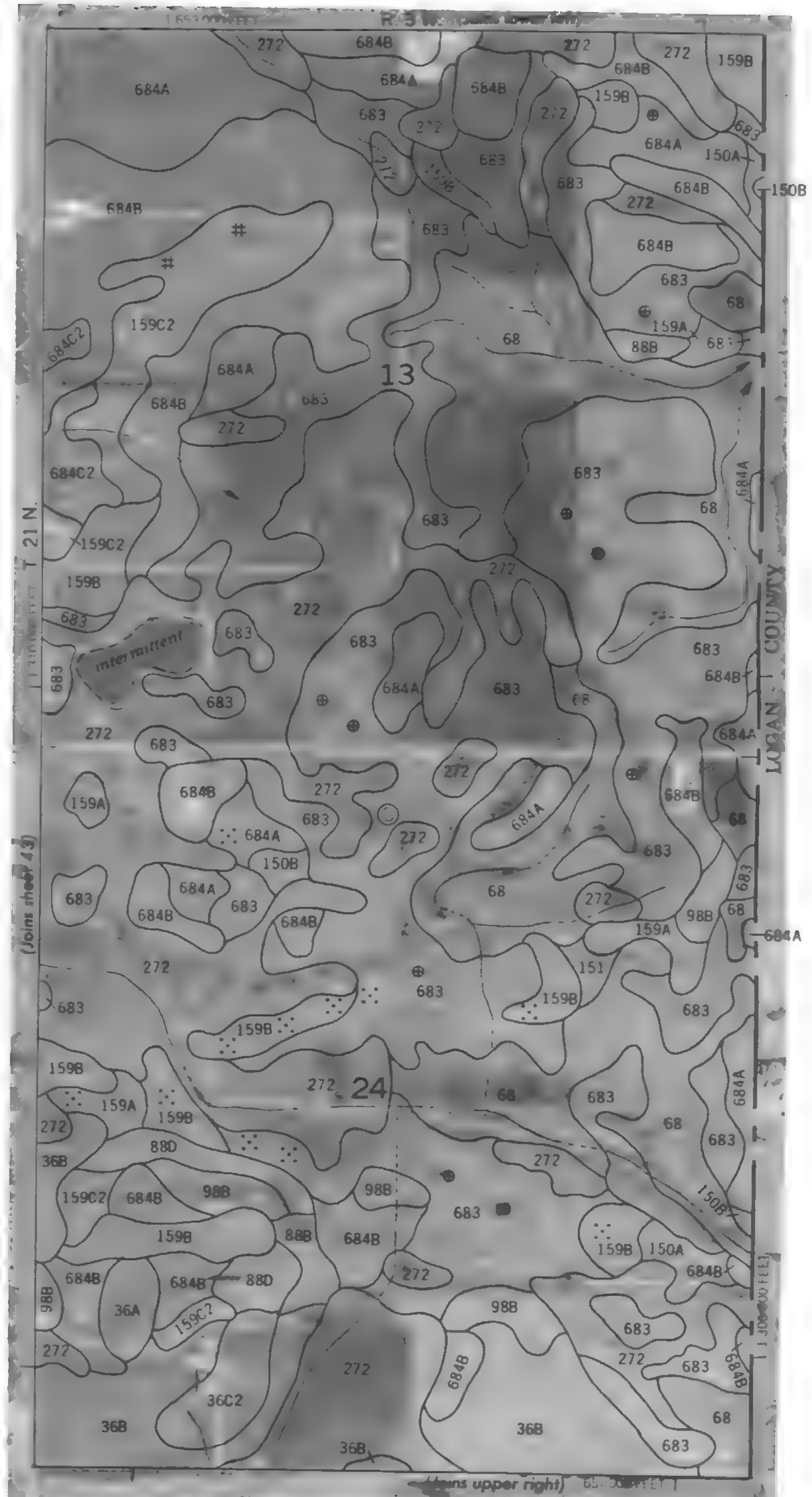
34


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 26)
R 5 W
T. 21 N.
(Joins sheet 33)
(Joins sheet 35)
(Joins sheet 43)
DITCH
GROVE
ALLENS
2
3
4
5
8
9
10
11

(35)

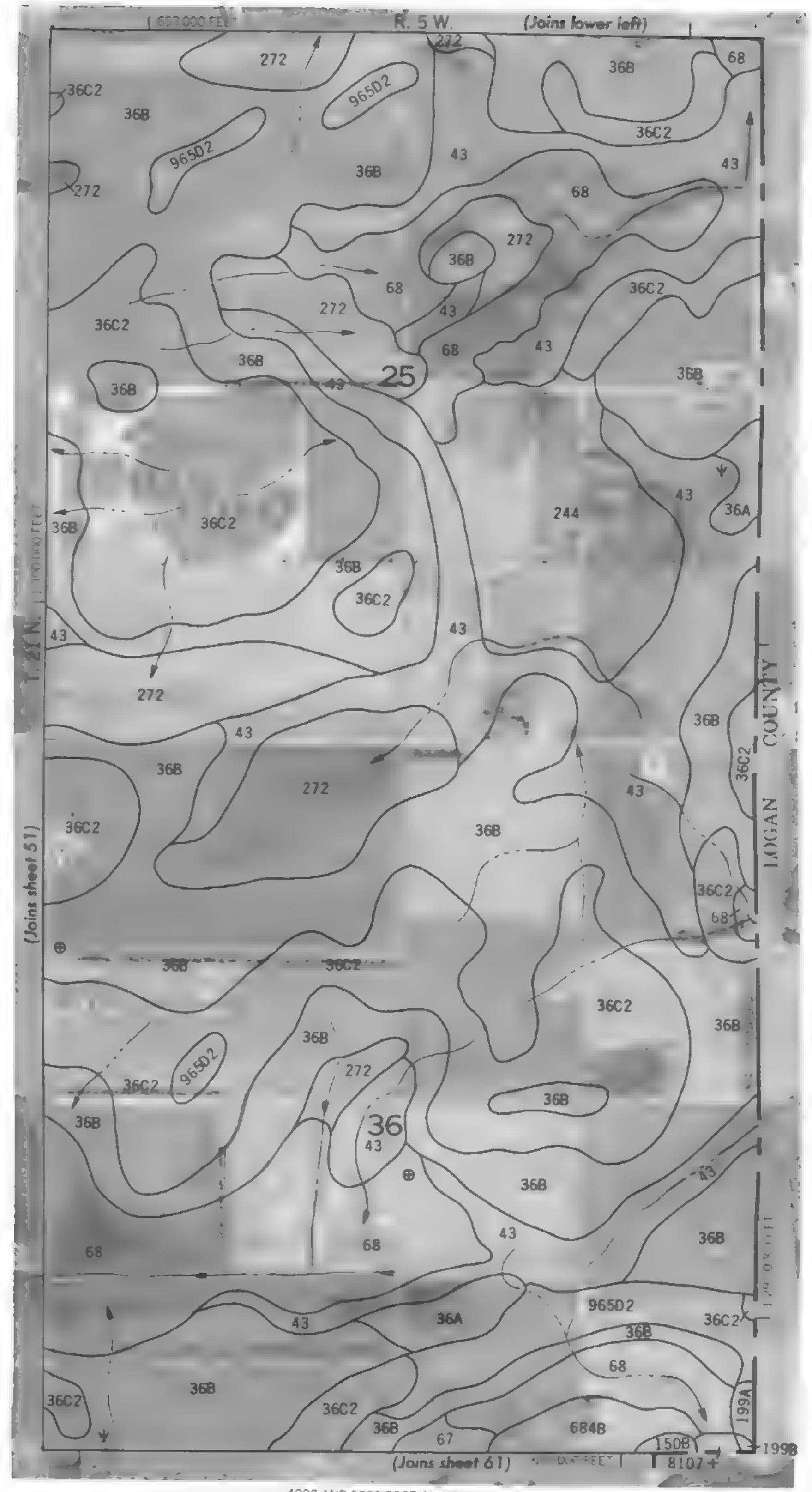


INSET A

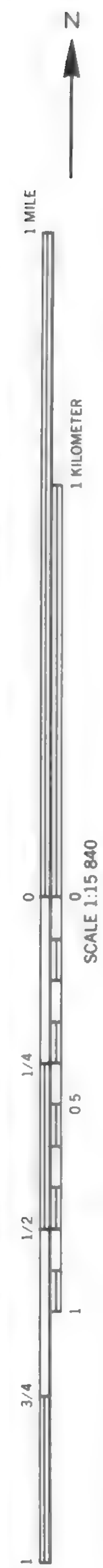


4000 AND 5000 FOOT GRID TICKS

INSET B



4000 AND 5000-FOOT GRID TICKS



36

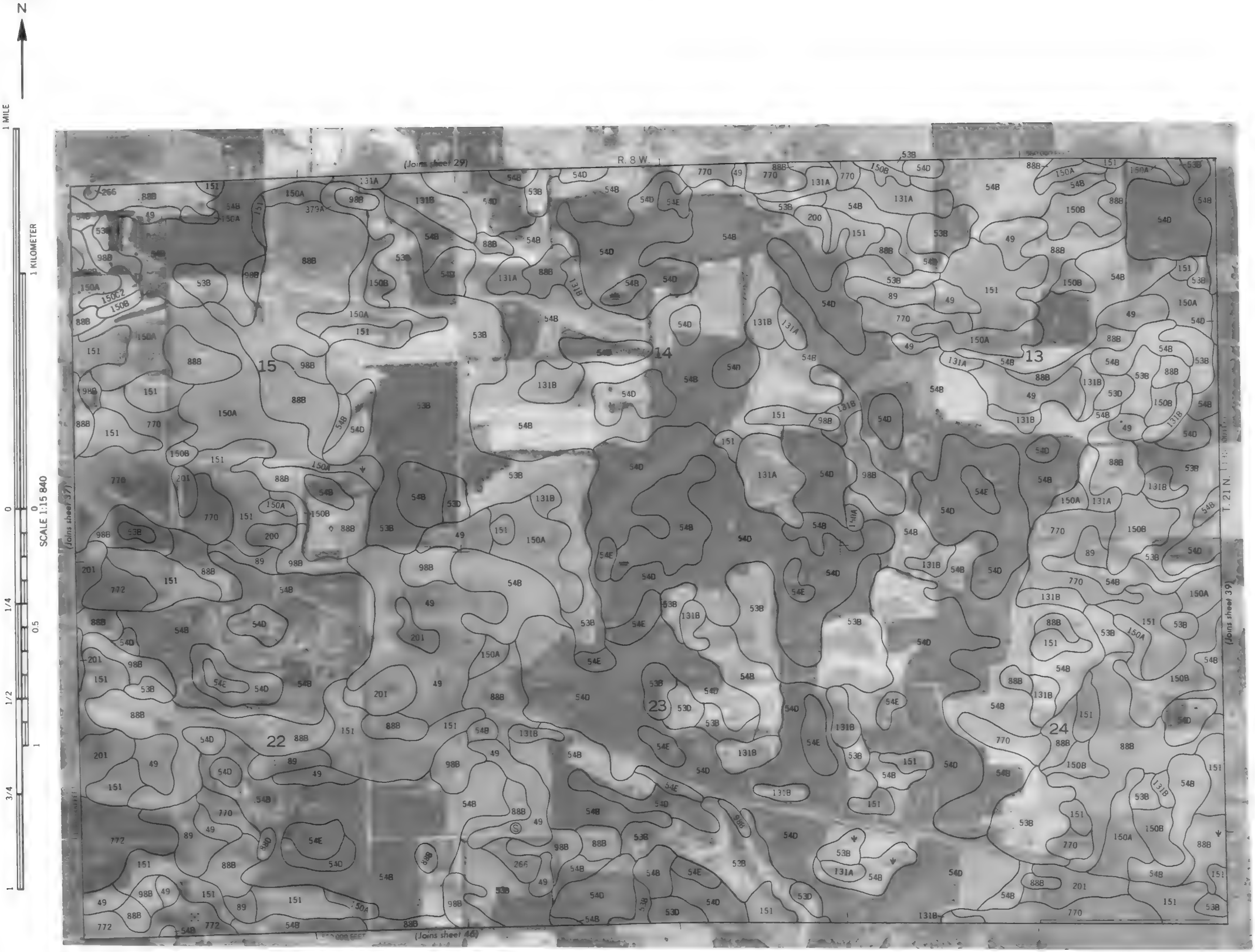
N

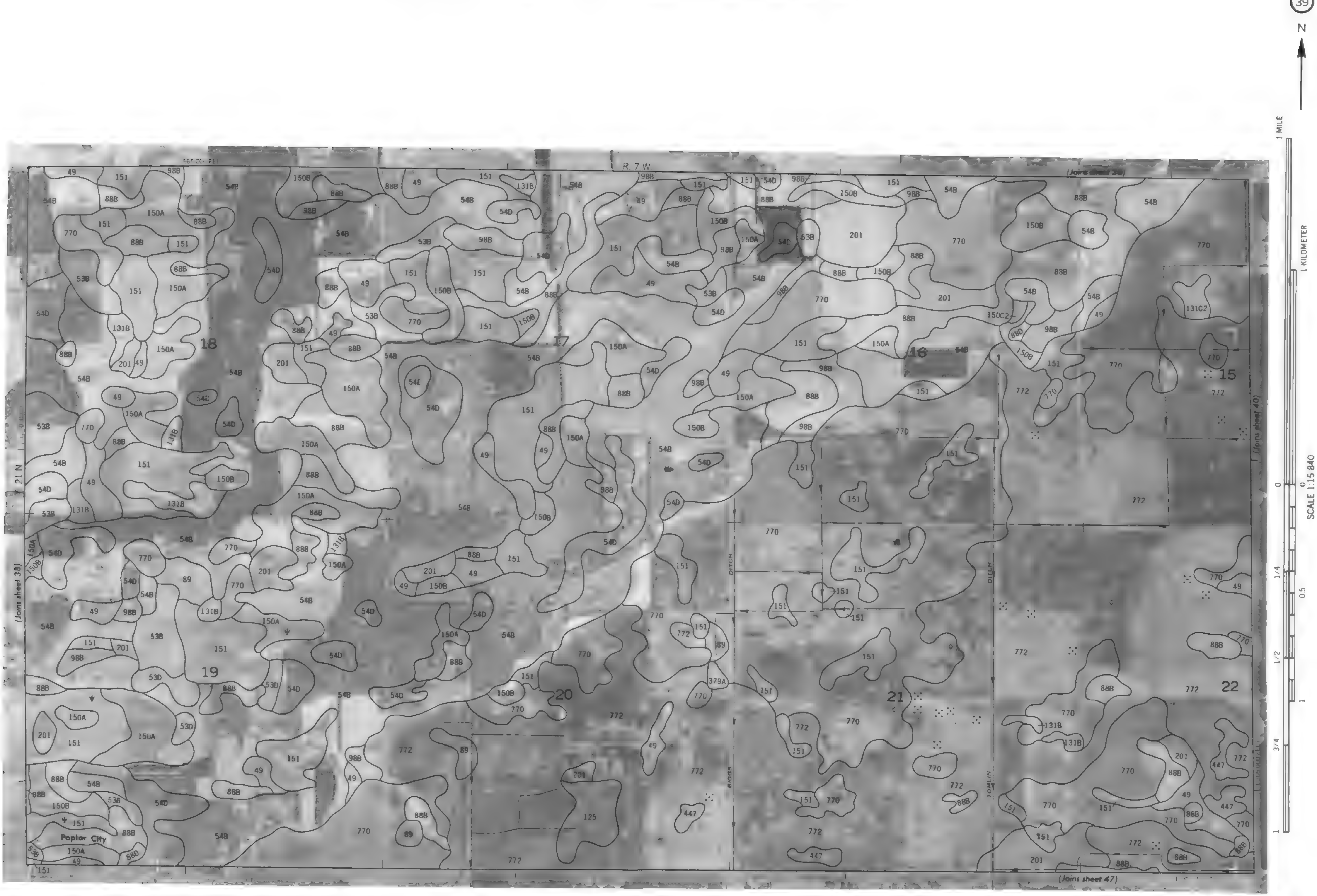

1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 27)
(Joins sheet 37)
(Joins sheet 44)
ILLINOIS RIVER
Matanzas Island
MATANZAS LAKE
Deep Slough
Lonje Pond
White Oak Creek
water
R. 9 W.
T. 21 N.
510 000 FEET
13
14
15
22
23
24

37

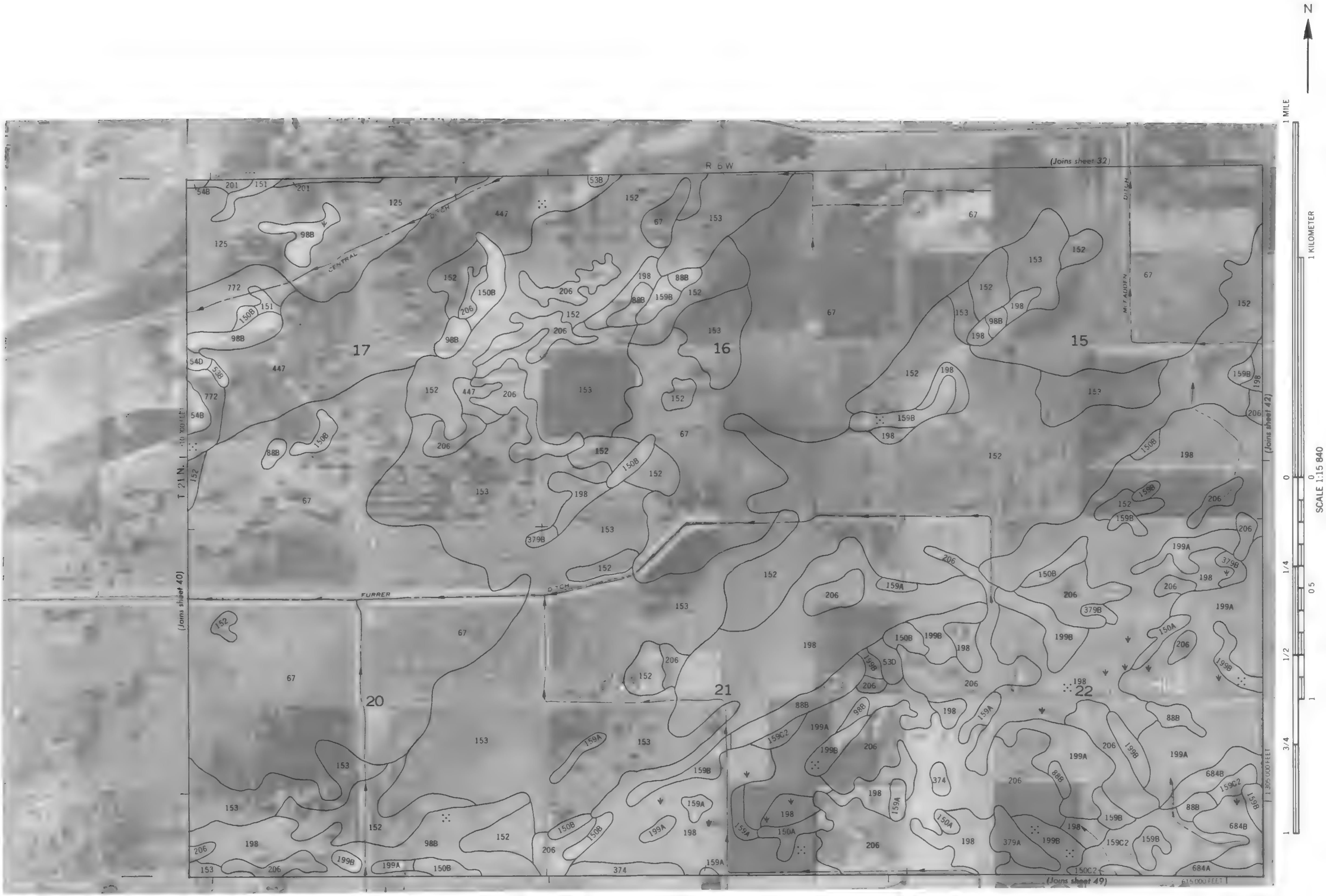

N
(Joins sheet 28)
(Joins sheet 36)
(Joins sheet 38)
(Joins sheet 45)
R. 9 W.
R. 8 W.
T. 21 N.
RAILROAD
White Oak Creek
Lake
13
16
17
18
19
20
21
24
1 MILE
1 KILOMETER
SCALE 1:15 840

SOIL SURVEY OF MASON COUNTY, ILLINOIS — SHEET NUMBER 38




39
N
R. 7 W.
(Joins sheet 38)
(Joins sheet 40)
(Joins sheet 47)
T. 21 N.
Poplar City
DITCH
BIGGS
TOMLIN
18
17
16
15
19
20
21
22
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


40
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
0.5
1/2
3/4
1
(Joins sheet 31)
(Joins sheet 48)
R 7 W | R 6 W
HARDIN
DITCH
CENTRAL
FURRER
RUSS AND TYRELL DITCH
13
14
15
18
19
22
23
24


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
R 6 W
(Joins sheet 32)
(Joins sheet 42)
(Joins sheet 49)
(Joins sheet 40)
T 21 N.
CENTRAL
DITCH
FURRER
DITCH
MC FADDEN
DITCH
17
16
15
20
21
22

SOIL SURVEY OF MASON COUNTY, ILLINOIS — SHEET NUMBER 42


43
N
R. 5 W.
(Joins sheet 34)
T. 21 N.
(Joins sheet 42)
(Joins inset A, sheet 35)
(Joins sheet 51)
Natrona
17
16
15
14
20
21
22
23
1 MILE
1 KILOMETER
SCALE 1:15 840

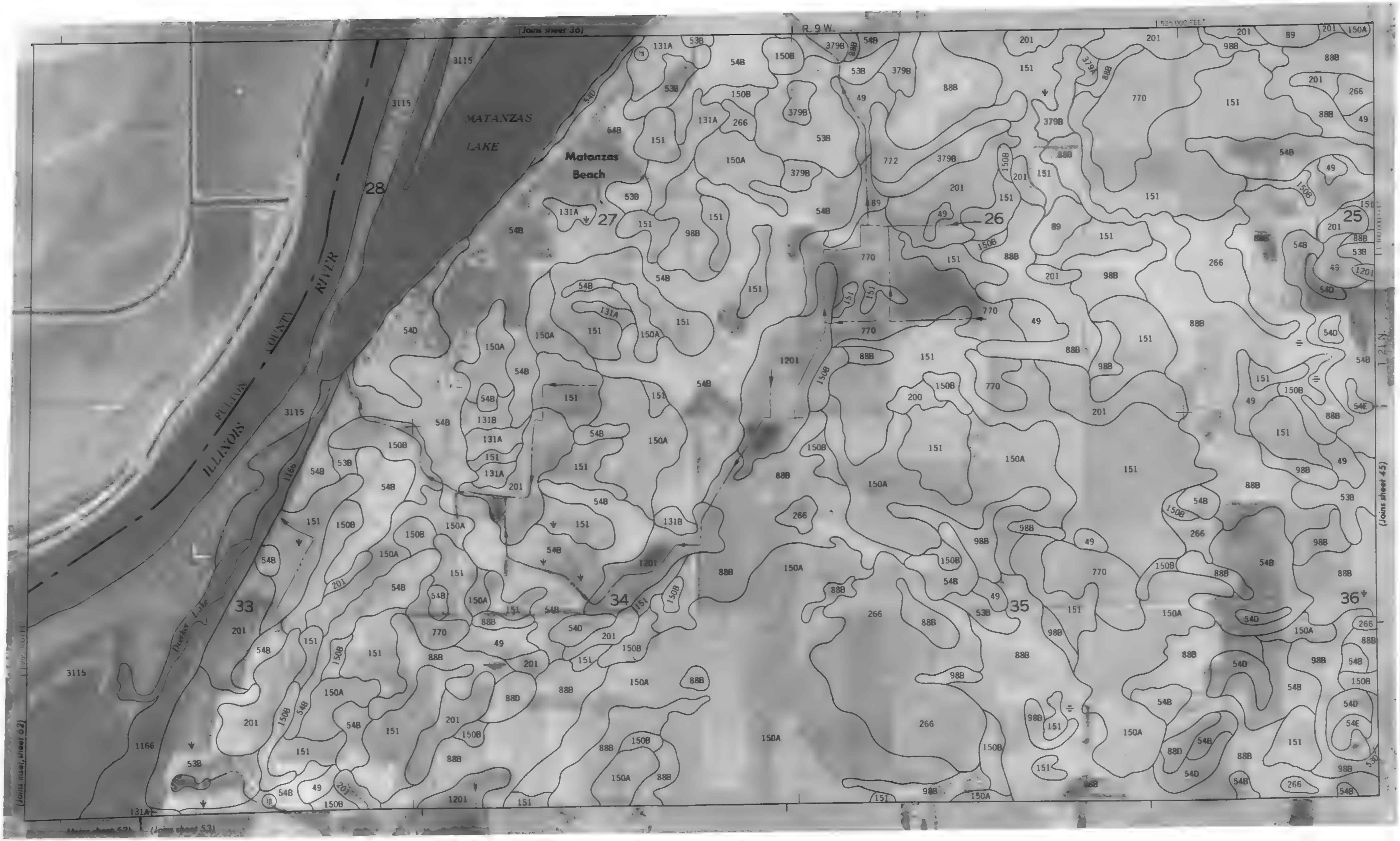
44

N

1 MILE

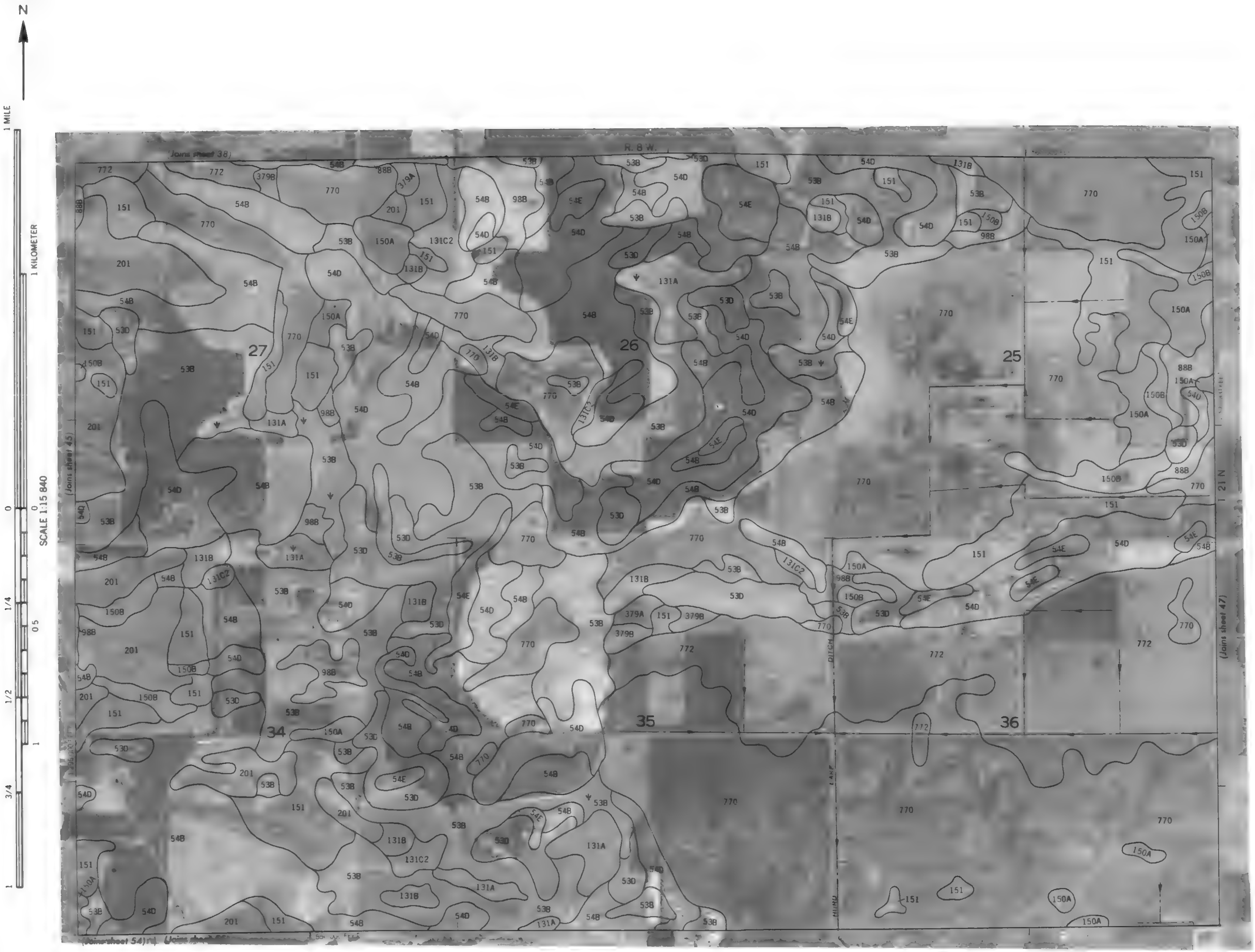
1 KILOMETER

SCALE 1:15 840




45
N
R. 9 W.
R. 8 W.
(Joins sheet 37)
(Joins sheet 44)
(Joins sheet 46)
(Joins sheet 54)
T. 21 N.
White
Oak
Creek
25
28
29
30
31
32
33
36
HAVANA
REGIONAL
AIRPORT
545 000 FEET
1 MILE
1 KILOMETER
SCALE 1:15 840

46

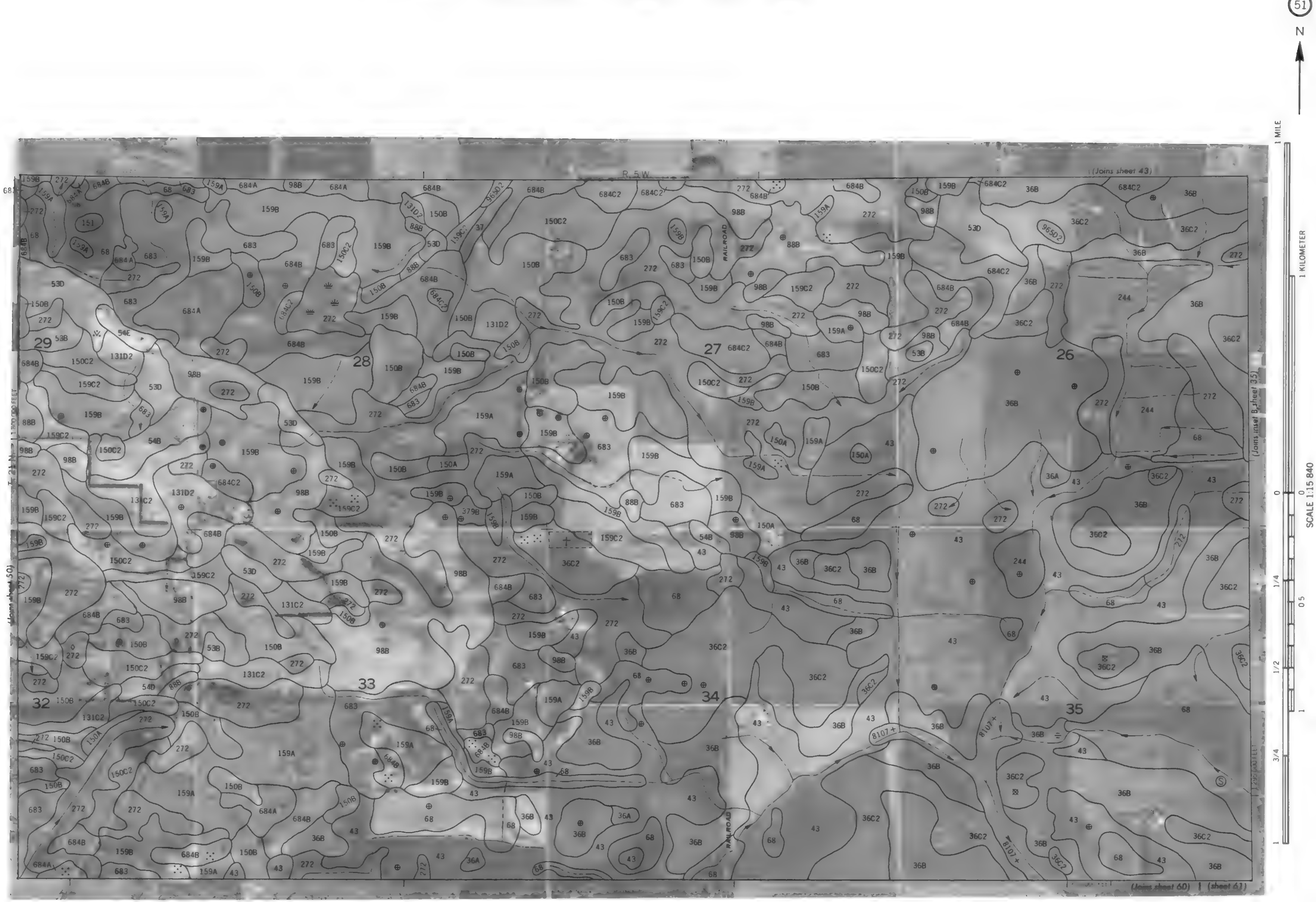

N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
R. 8 W.
21 N
(Joins sheet 38)
(Joins sheet 45)
(Joins sheet 47)
(Joins sheet 54)
27
26
25
34
35
36
DITCH
LAKE


N
R 7 W
(Joins sheet 39)
(Joins sheet 46)
(Joins sheet 48)
(Joins sheet 56)
T 21 N
Biggs
NEWTON
DITCH
BIGGS
Crane
Creek
29
28
27
30
31
32
33
34
1 MILE
1 KILOMETER
SCALE 1:15 840

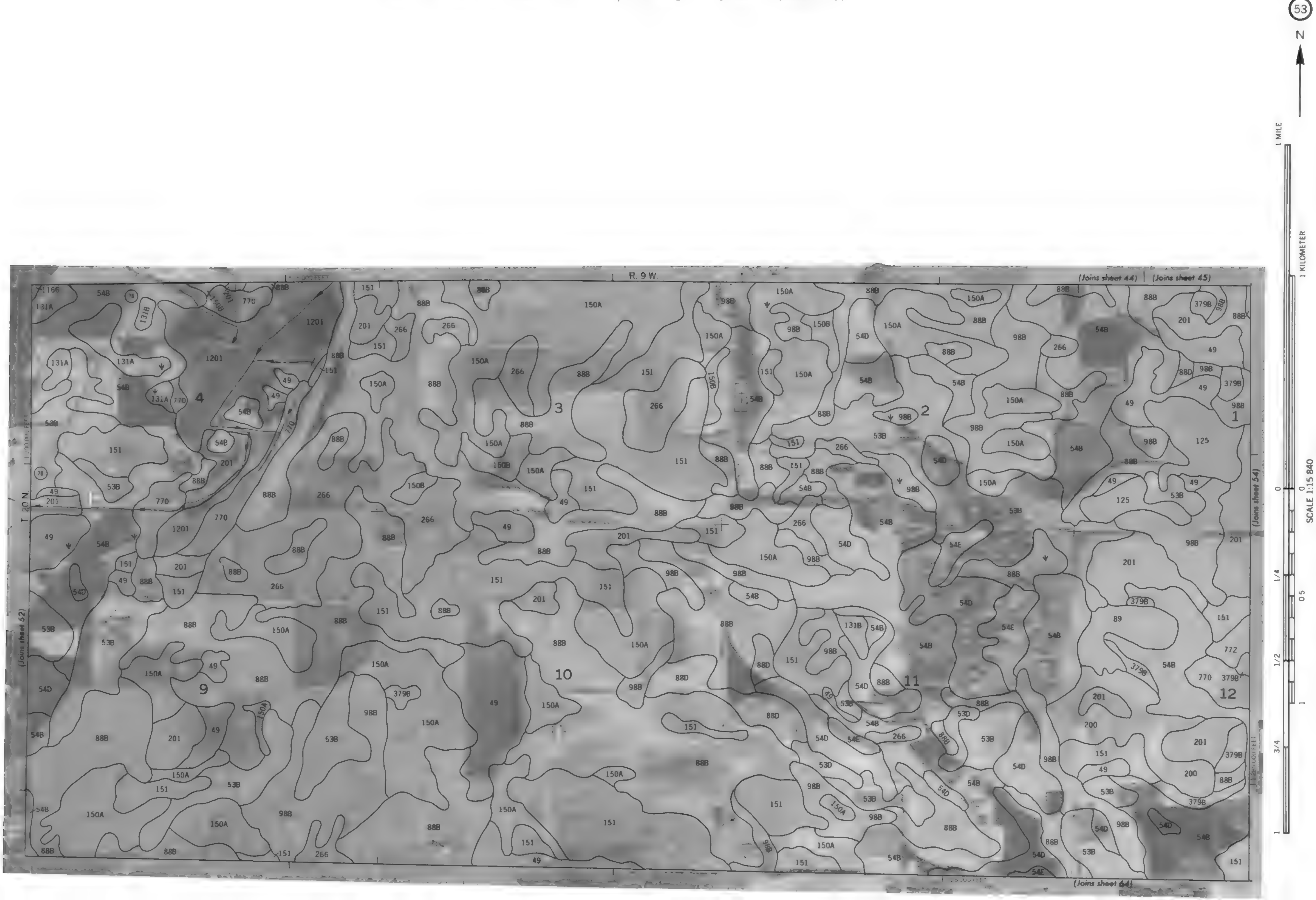

N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
0.5
1/2
3/4
1
(Joins sheet 40)
R. 7 W.
R. 6 W.
T. 21 N.
(Joins sheet 47)
(Joins sheet 49)
(Joins sheet 57)
Crane Creek
SAMUELS DITCH
TYRELL AND ROSS DITCH
Easton
CEMETERY
25
26
27
30
31
34
35
36


49
N
1 MILE
1 KILOMETER
SCALE 1:15 840
R. 6 W.
(Joins sheet 41)
T. 21 N.
(Joins sheet 48)
(Joins sheet 50)
(Joins sheet 58)
(sheet 59)
Teheran
27
28
29
32
33
34

SOIL SURVEY OF MASON COUNTY, ILLINOIS — SHEET NUMBER 50


51
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 43)
R. 5 W.
T. 21 N.
(Joins sheet 50)
(Joins inset B, sheet 35)
(Joins sheet 60)
(sheet 61)
RAILROAD
26
27
28
29
32
33
34
35


52
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
R 10 W
R 9 W
ILLINOIS RIVER
FULTON COUNTY
1
6
5
12
7
8
3115
1156
54D
54B
53B
201
49
GRASS LAKE
GRAND ISLAND
SWAN LAKE
Bath Lake
EAST BRANCH ILLINOIS RIVER
water
3682
3088B
3304
131A
88B
Bath
20 N.


53
N
R. 9 W.
(Joins sheet 44)
(Joins sheet 45)
(Joins sheet 52)
(Joins sheet 54)
(Joins sheet 64)
T 20 N
1 MILE
1 KILOMETER
SCALE 1:15 840
1
2
3
4
9
10
11
12


54
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
R. 9 W. | R. 8 W.
(Joins sheet 45)
(Joins sheet 46)
(Joins sheet 53)
(Joins sheet 55)
(Joins sheet 65)
T. 20 N.
RAILROAD
RAILROAD
1
4
5
6
7
8
9
12

SOIL SURVEY OF MASON COUNTY, ILLINOIS — SHEET NUMBER 55

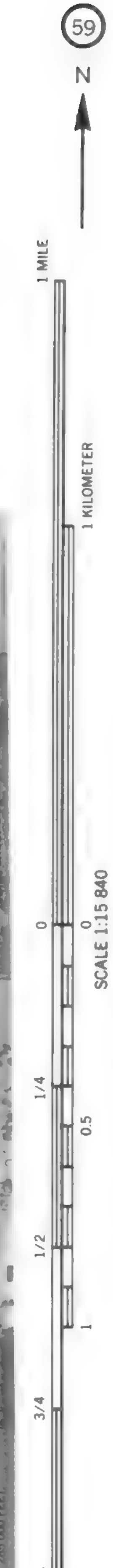

N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 47)
R. 7 W.
(Joins sheet 55)
(Joins sheet 57)
(Joins sheet 67)
1 285 000 FEET
565 000 FEET
Crane
Creek
Wash
Slough
Newton
Hall
Ditch
6
5
4
3
7
8
9
10


57
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(47)
(Joins sheet 48)
(Joins sheet 56)
(Joins sheet 58)
R. 7 W.
R. 6 W.
T. 20 N.
HALL
DITCH
Wash
Lake
Slough
595 000 FEET
1 285 000 FEET

N

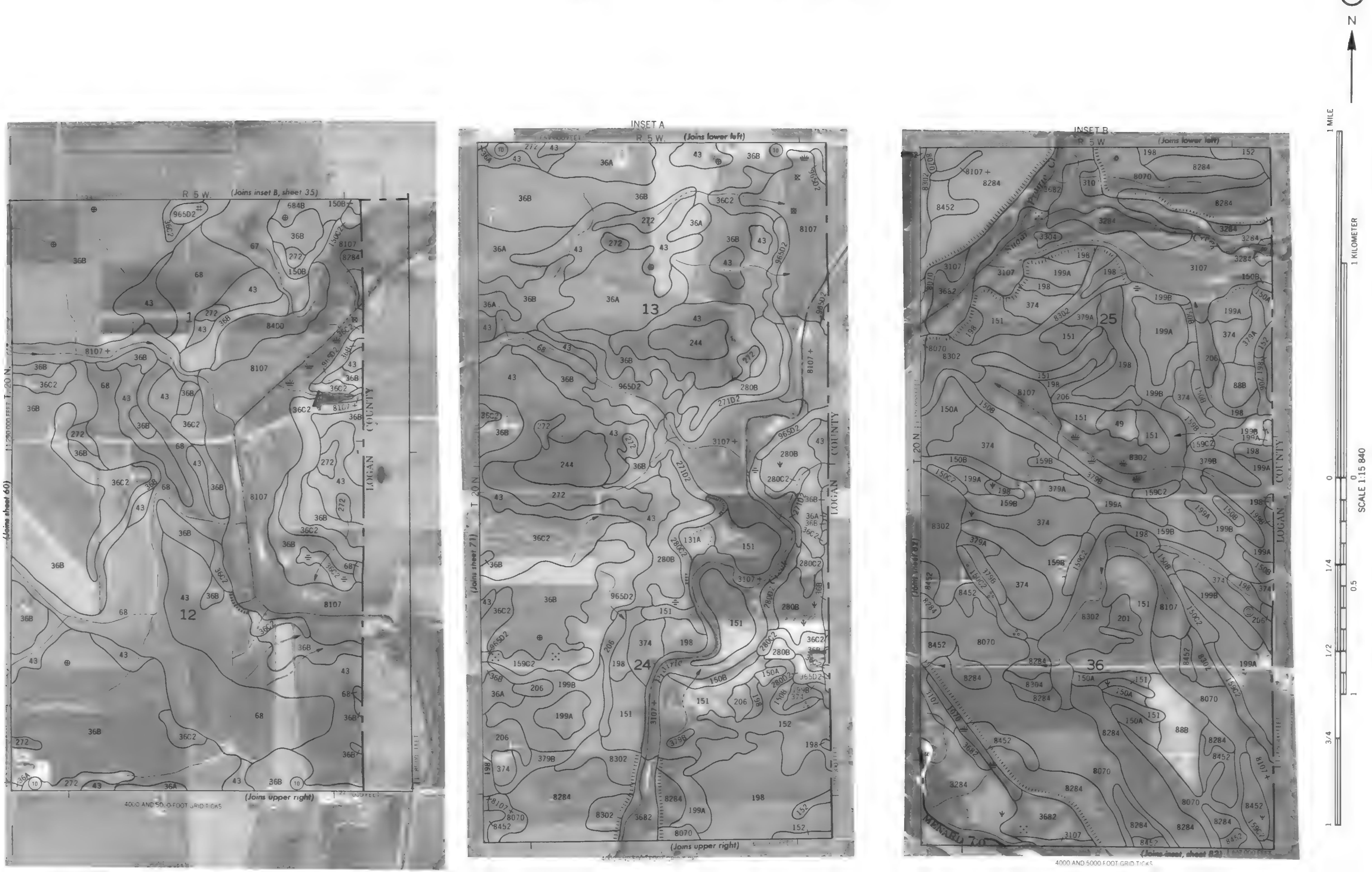

1 MILE
1 KILOMETER
SCALE 1:15 840
(48)
(Joins sheet 49)
R. 6 W.
T. 20 N.
(Joins sheet 57)
(Joins sheet 59)
(Joins sheet 69)
3
4
5
8
9
10

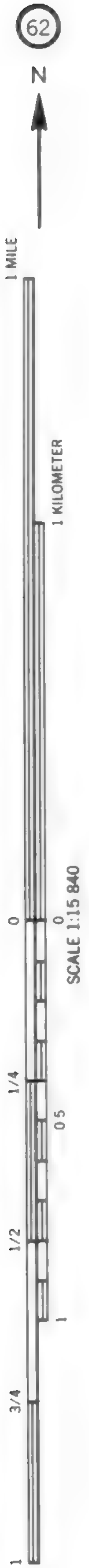
(49)
(Joins sheet 50)
R. 6 W.
R. 5 W.
T. 20 N.
(Joins sheet 58)
(Joins sheet 60)
(Joins sheet 70)
MASON CITY

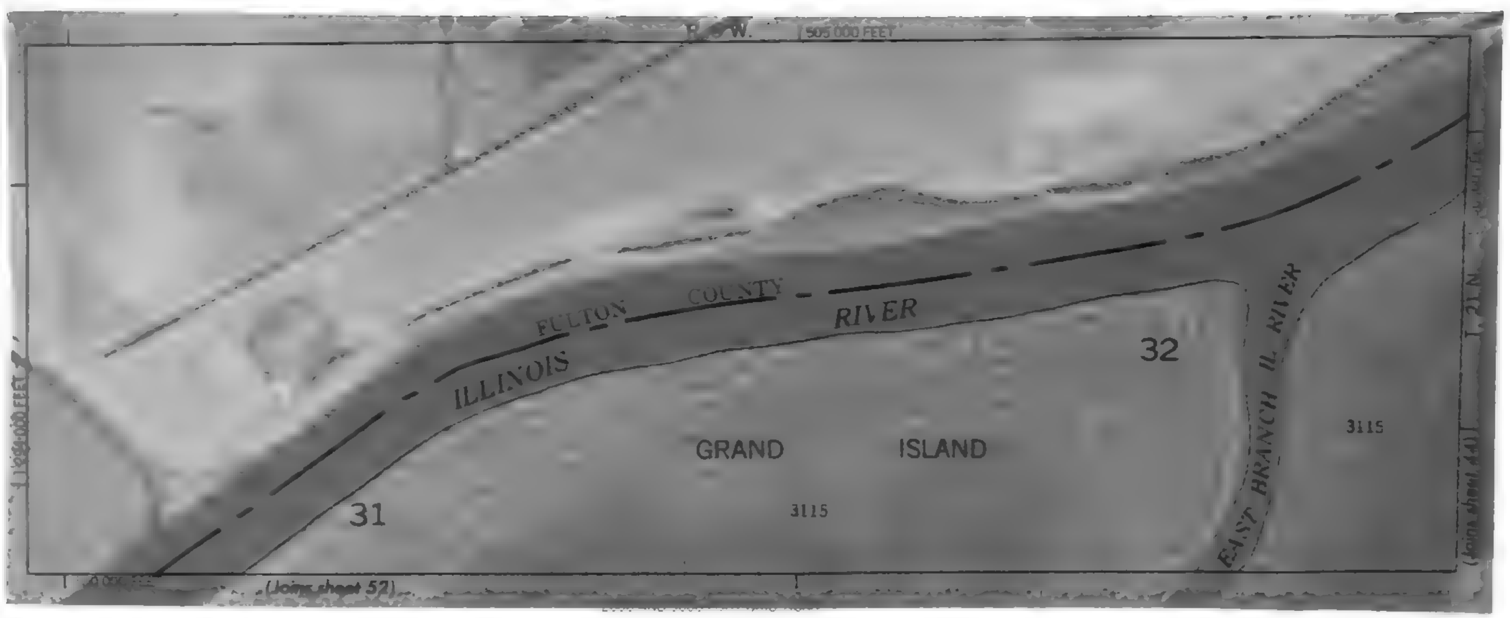


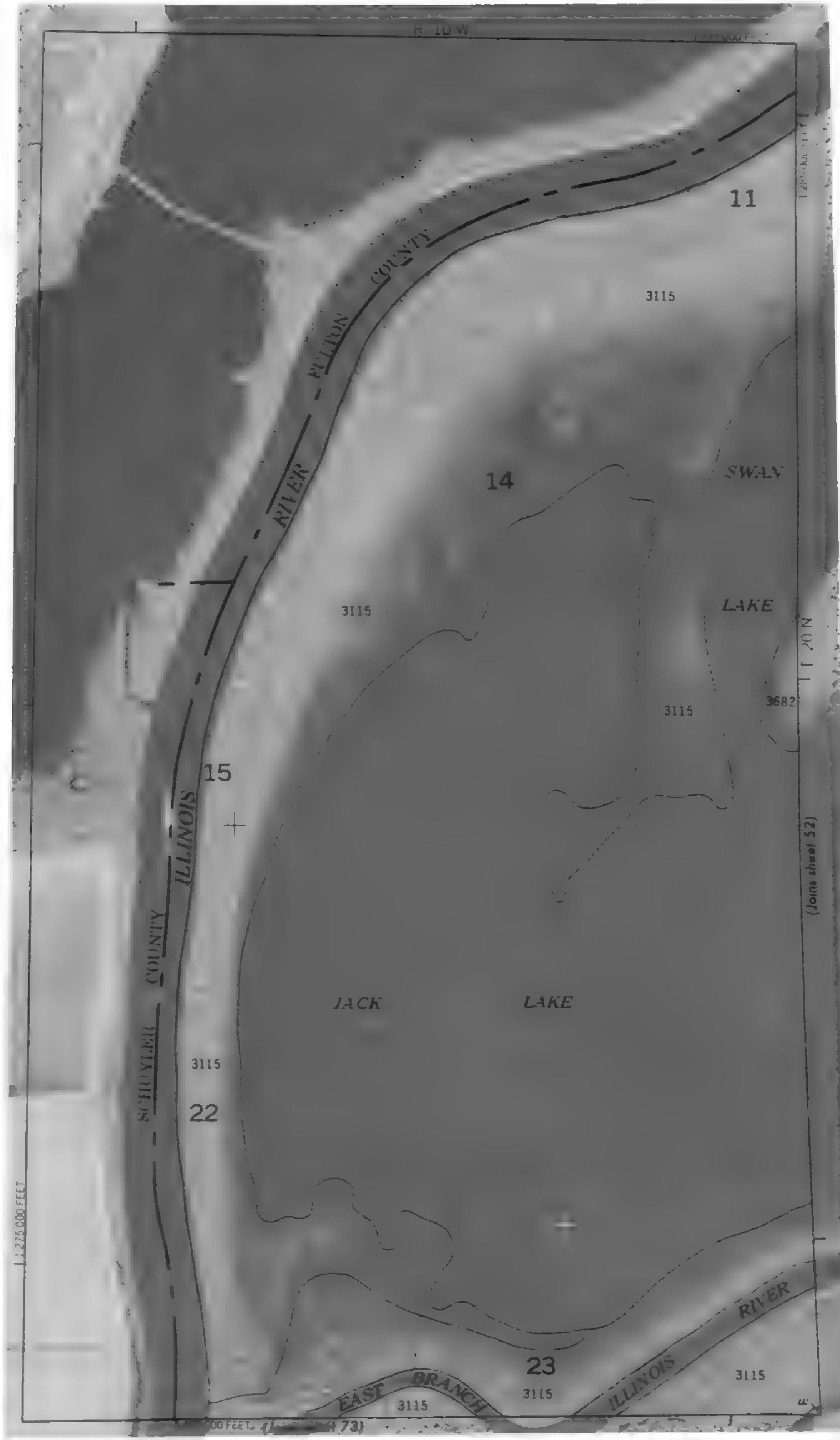
59
N
1 MILE
1 KILOMETER
SCALE 1:15 840

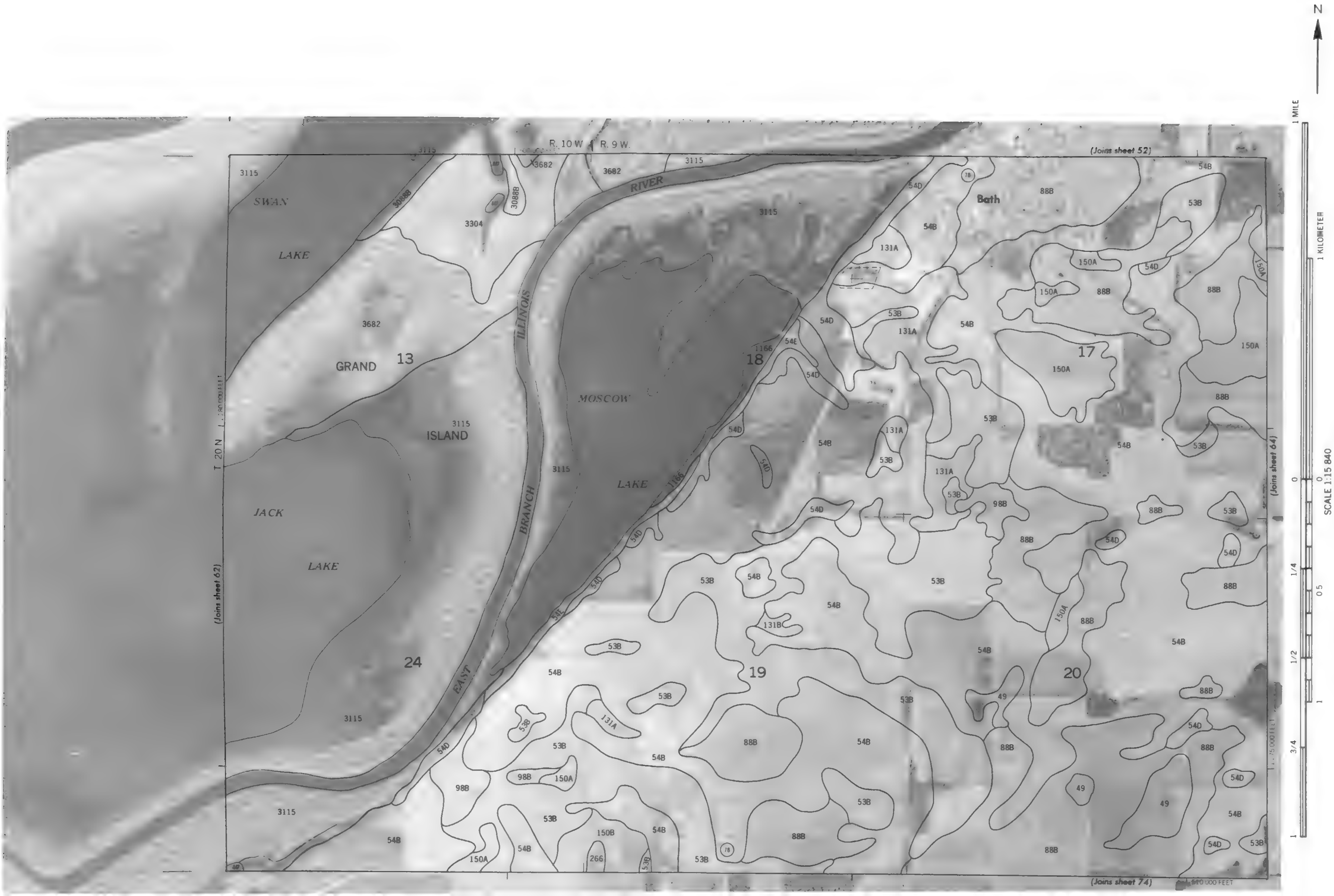

N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
(Joins 50)
(Joins sheet 51)
R 5 W
(Joins sheet 59)
(Joins sheet 61)
(Joins sheet 71)
T 20 N
MASON CITY
CEMETERY
RAILROAD
2
3
4
5
8
9
10
11
1 285 000 FEET
635 000 FEET

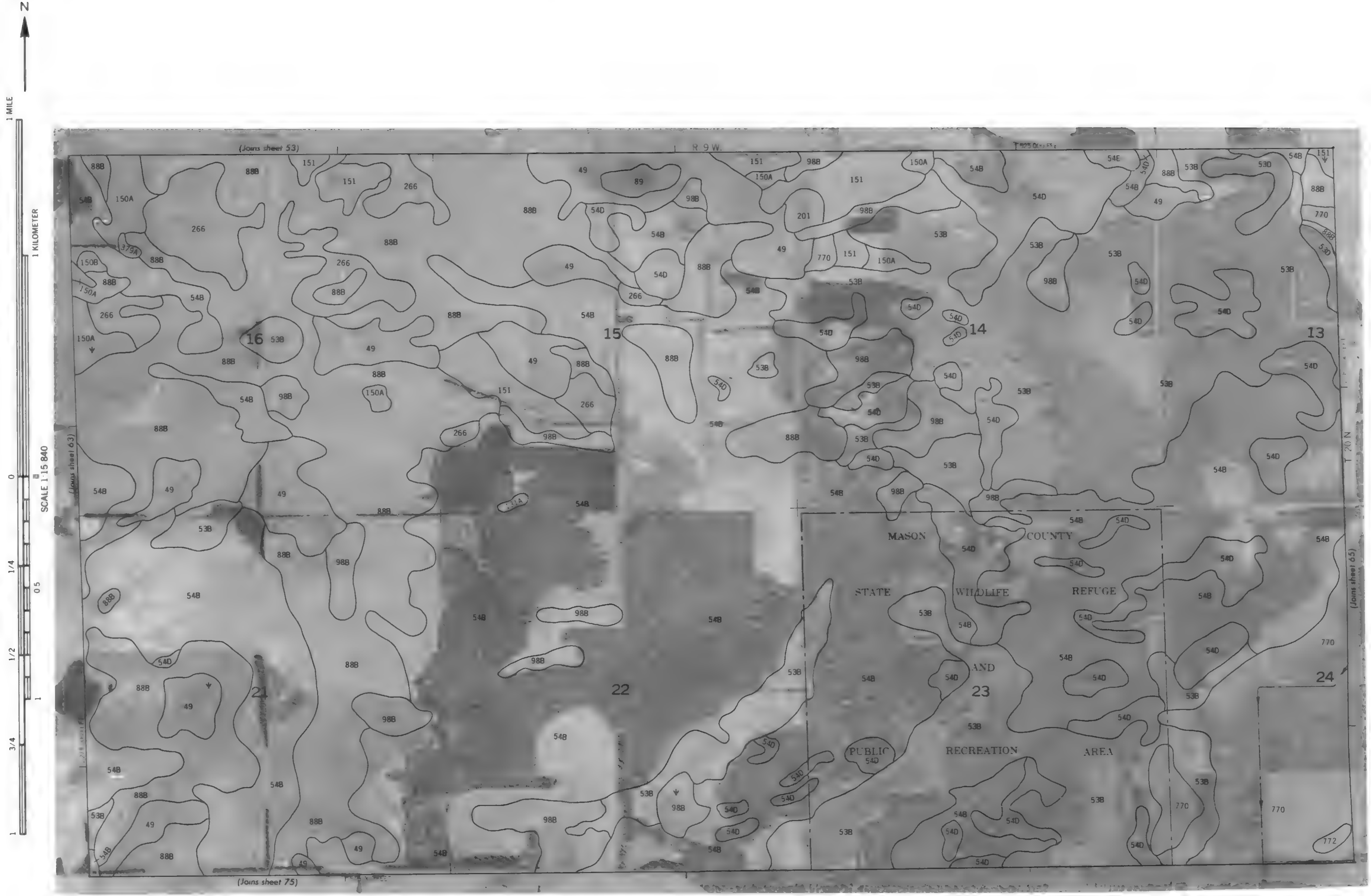

61
N
R. 5 W.
(Joins inset B, sheet 35)
(Joins sheet 60)
T. 20 N.
LOGAN COUNTY
(Joins upper right)
4000 AND 5000-FOOT GRID TICKS
INSET A
(Joins lower left)
(Joins sheet 71)
INSET B
(Joins inset, sheet 82)
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5

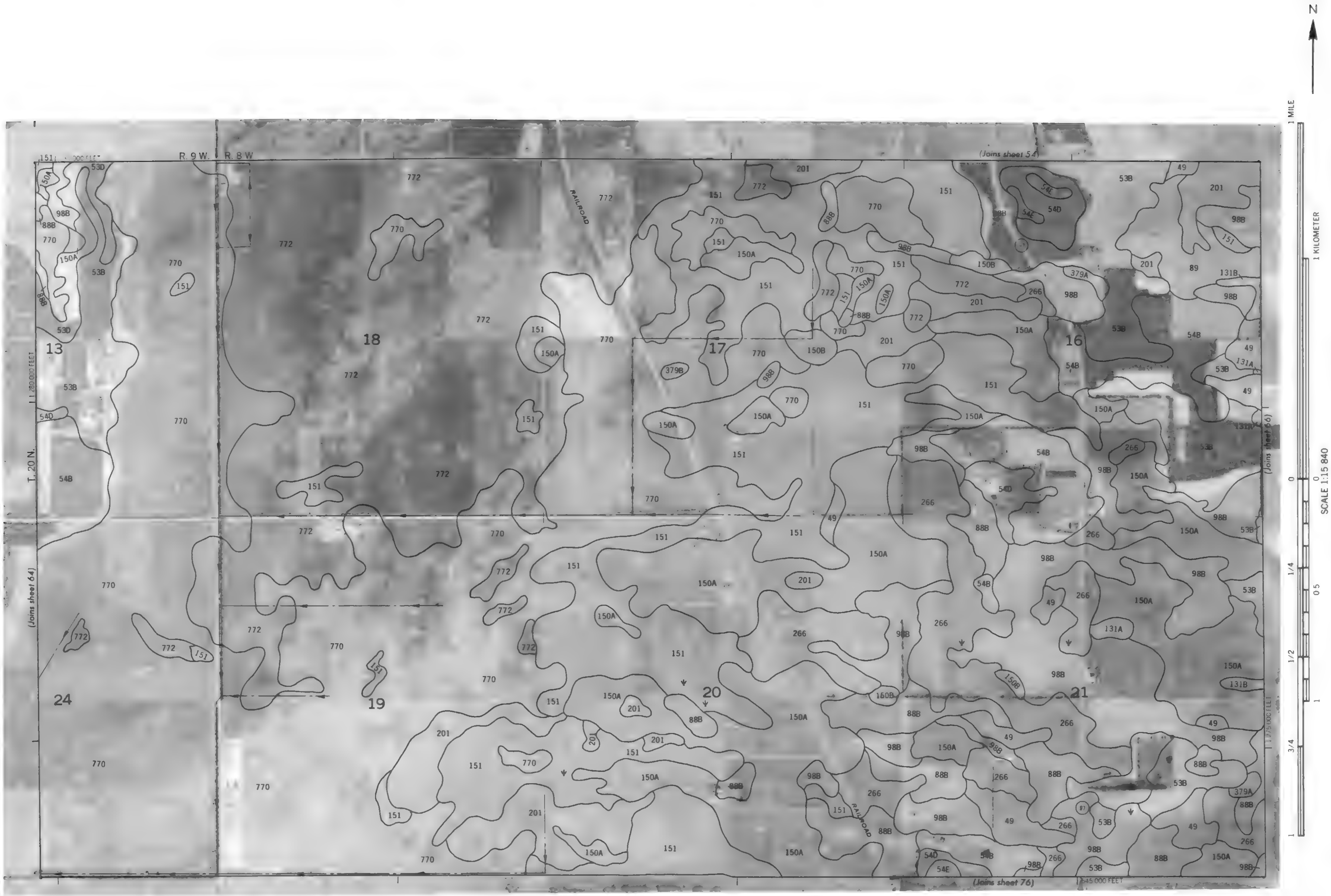

62
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1


505 000 FEET
FULTON
COUNTY
ILLINOIS
RIVER
32
31
GRAND
ISLAND
3115
EAST BRANCH IL. RIVER
T. 21 N.
(Joins sheet 44)
(Joins sheet 52)


R. 10 W.
FULTON
COUNTY
RIVER
11
3115
14
SWAN
LAKE
3115
3115
3682
15
ILLINOIS
SCHUYLER
COUNTY
T. 20 N.
(Joins sheet 52)
JACK
LAKE
3115
22
1 275 000 FEET
RIVER
ILLINOIS
23
EAST
BRANCH
3115
3115
3115


N
R. 10 W.
R. 9 W.
T. 20 N.
(Joins sheet 52)
(Joins sheet 62)
(Joins sheet 64)
(Joins sheet 74)
SWAN
LAKE
GRAND
ISLAND
JACK
LAKE
MOSCOW
LAKE
ILLINOIS
RIVER
EAST
BRANCH
Bath
13
17
18
19
20
24
3115
3088B
3304
3682
1166
54B
54D
54E
53B
88B
98B
131A
131B
150A
150B
49
266
78
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
0.5
1/2
3/4
1
(Joins sheet 53)
R 9 W.
(Joins sheet 63)
(Joins sheet 65)
(Joins sheet 75)
T 20 N
16
15
14
13
21
22
23
24
MASON
COUNTY
STATE
WILDLIFE
REFUGE
AND
PUBLIC
RECREATION
AREA


N
R. 9 W.
R. 8 W.
T. 20 N.
(Joins sheet 54)
(Joins sheet 64)
(Joins sheet 66)
(Joins sheet 76)
RAILROAD
RAILROAD
13
18
17
16
24
19
20
21
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1


66
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 77)
(Joins sheet 67)
R. 8 W.
T. 20 N.
15
14
13
22
23
24
Crane
Creek

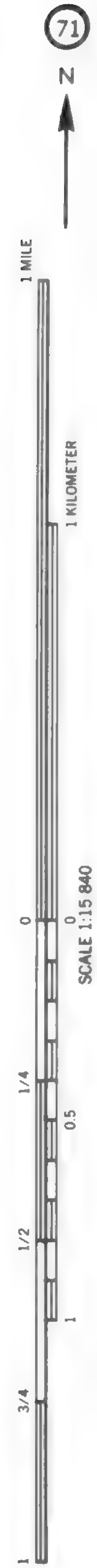

N
R 7 W
(Joins sheet 58)
(Joins sheet 68)
(Joins sheet 66)
T 20 N
Crane
Creek
18
17
16
15
19
20
21
22
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
0.5
1/2
3/4
1
(Joins sheet 57)
(Joins sheet 67)
(Joins sheet 69)
(Joins sheet 79)
R. 7 W.
R. 6 W.
T. 20 N.
Lake
13
14
15
18
19
22
23
24

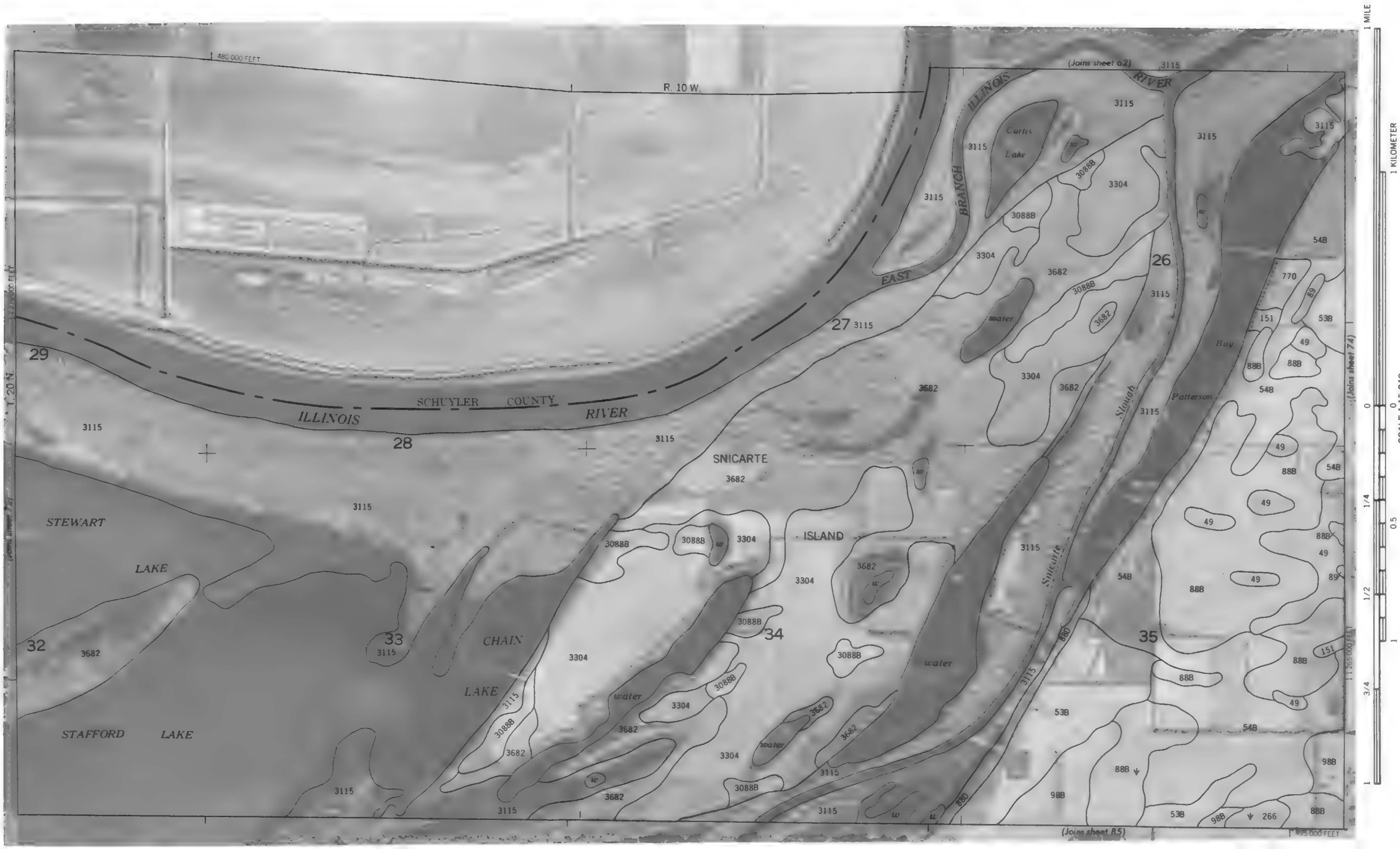

N
1 MILE
1 KILOMETER
SCALE 1:15 840
R 6 W
(Joins sheet 58)
(Joins sheet 68)
(Joins sheet 80)
T. 20 N.
SLEEPY
HOLLOW
DITCH
17
16
15
20
22

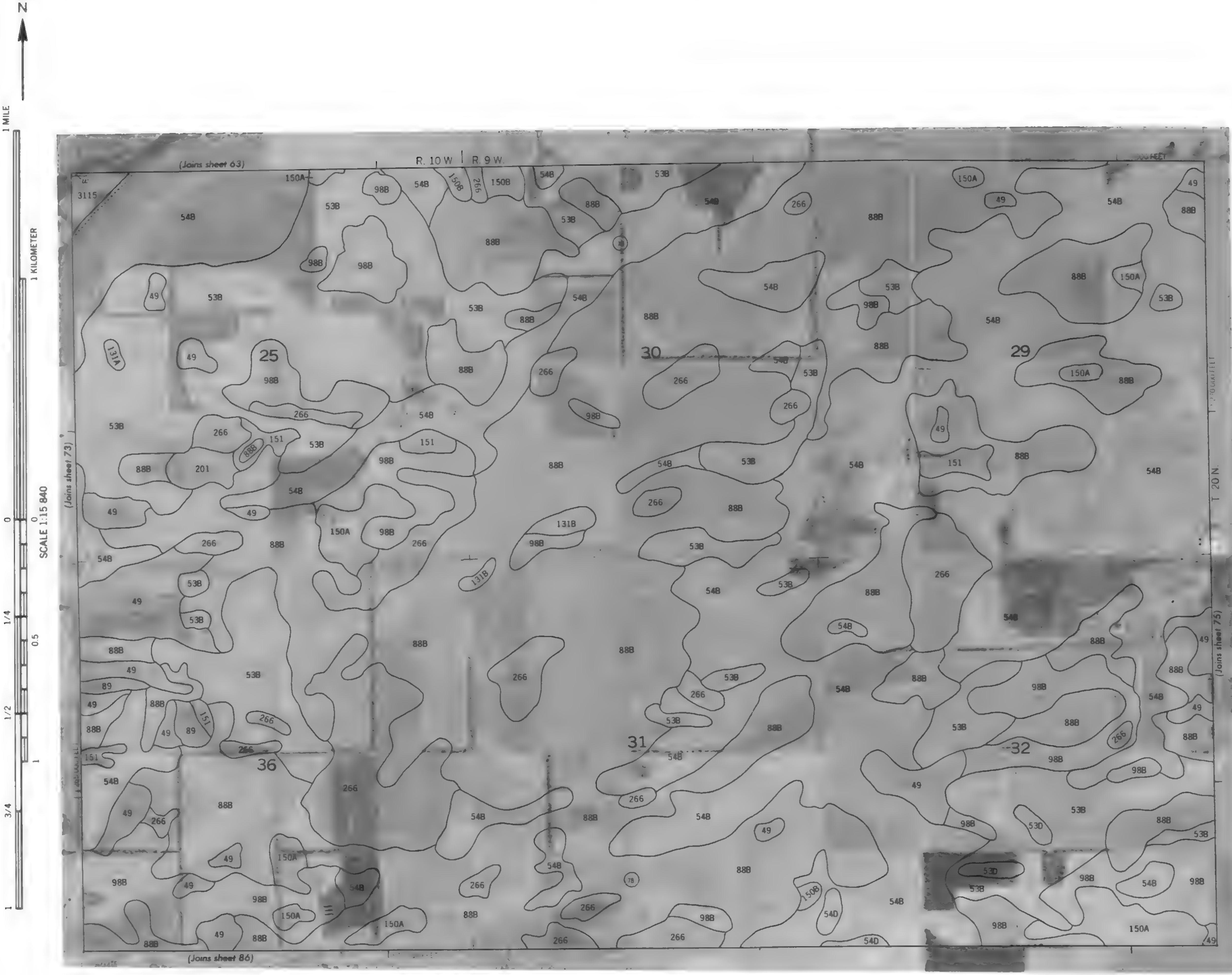

70
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 59)
(Joins sheet 69)
(Joins sheet 71)
(Joins sheet 81)
R. 6 W. | R. 5 W.
14
13
18
17
23
24
19
20
SEWAGE LAGOONS


R. 5 W.
(Joins sheet 60)
(Joins sheet 70)
(Joins inset A, sheet 61)
(Joins sheet 82)
T. 20 N.
635 000 FEET
1 280 000 FEET
1 275 000 FEET
650 000 FEET
RAILROAD
14
15
16
17
20
21
22
23


71
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


72
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
R. 11 W.
R. 10 W.
T. 20 N.
ILLINOIS
RIVER
SCHUYLER
COUNTY
STEWART
LAKE
STAFFORD
LAKE
INGRAM
LAKE
30
29
25
36
35
31
32
3115
3682
3304
3088B
1070
(Joins sheet 73)
(Joins sheet 84)

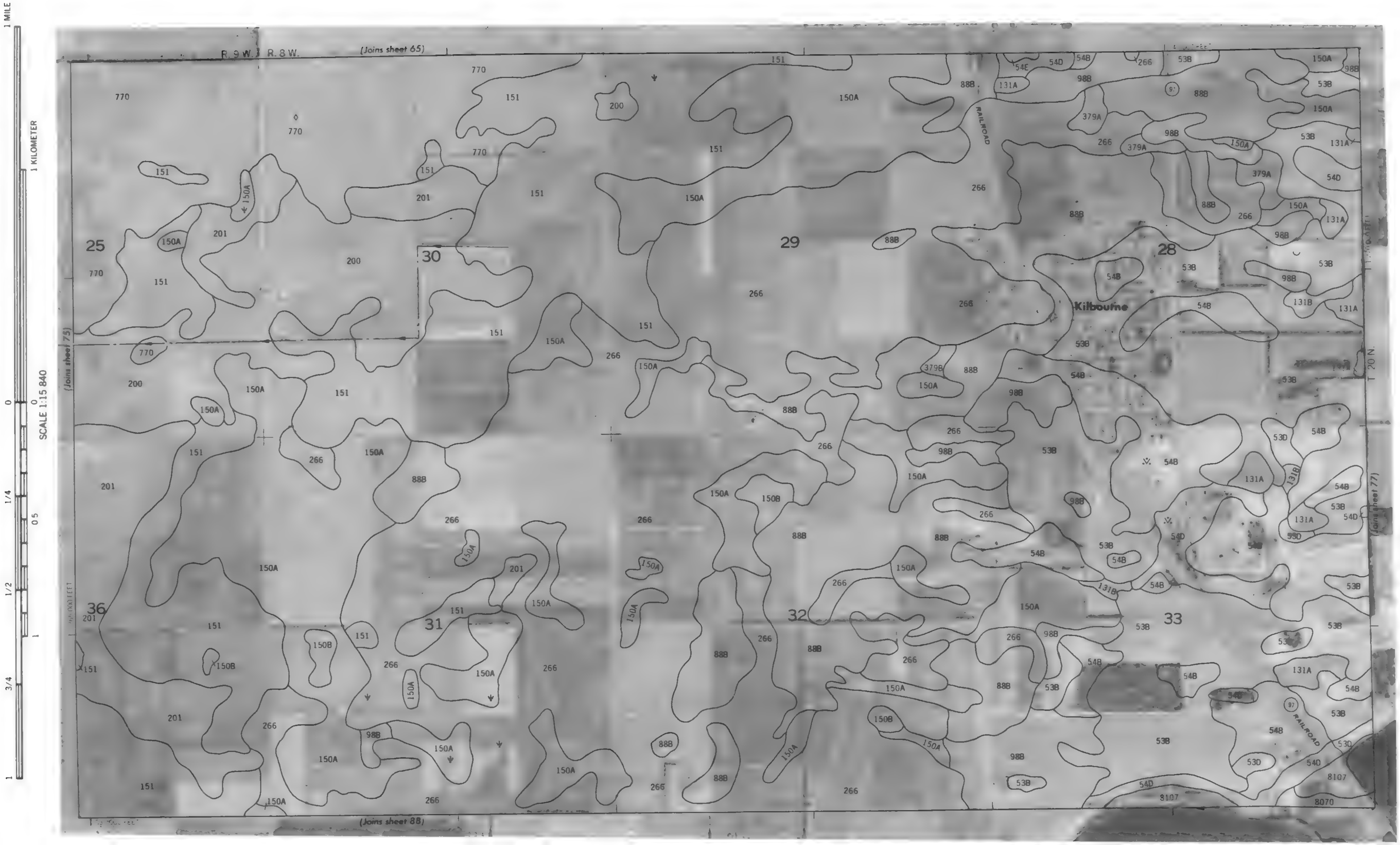

N
1 MILE
1 KILOMETER
SCALE 1:15 840
480 000 FEET
R. 10 W.
(Joins sheet 62)
(Joins sheet 74)
(Joins sheet 85)
495 000 FEET
T. 20 N.
ILLINOIS RIVER
SCHUYLER COUNTY
EAST BRANCH ILLINOIS RIVER
Curtis Lake
SNICARTE ISLAND
Snicarte Slough
Patterson Bay
STEWART LAKE
STAFFORD LAKE
CHAIN LAKE
water
26
27
28
29
32
33
34
35
3115
3304
3682
3088B
54B
53B
88B
98B
49
89
151
770
266
880

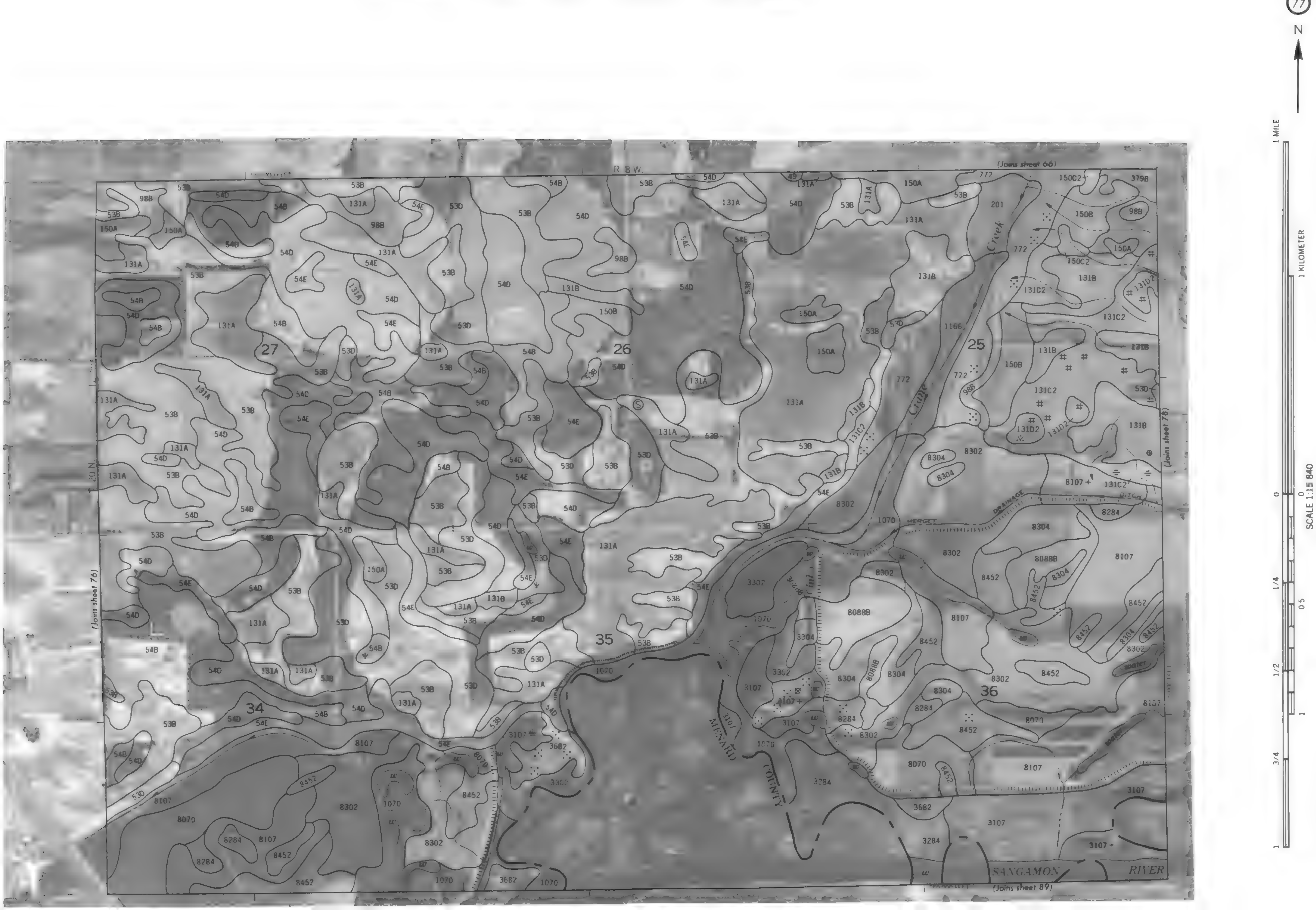

N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 63)
R. 10 W.
R. 9 W.
(Joins sheet 73)
(Joins sheet 75)
(Joins sheet 86)
T. 20 N.
25
30
29
36
31
32


N
R 9 W.
(Joins sheet 64)
MASON COUNTY STATE
WILDLIFE REFUGE AND
PUBLIC RECREATION AREA
T. 20 N.
(Joins sheet 74)
(Joins sheet 76)
(Joins sheet 87)
Jordan Creek
28
27
26
25
33
34
35
36
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5

76

N


1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 65)
(Joins sheet 88)
(Joins sheet 75)
(Joins sheet 77)
R. 9 W.
R. 8 W.
T. 20 N.
Kilbourne
RAILROAD
25
28
29
30
31
32
33
36


N
R. 8 W.
(Joins sheet 66)
(Joins sheet 76)
(Joins sheet 78)
(Joins sheet 89)
20 N.
27
26
25
34
35
36
Crane Creek
HERGET DRAINAGE DITCH
MENARD COUNTY
SANGAMON RIVER
water
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


78
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 67)
R. 7 W.
(Joins sheet 77)
(Joins sheet 79)
(Joins sheet 89)
20 N.
HERGET
HERGET DRAINAGE DITCH
BOTTOMS
Perry Slough
SANGAMON RIVER
MENARD COUNTY
30
29
28
27
31
32
33
34
5
4
water

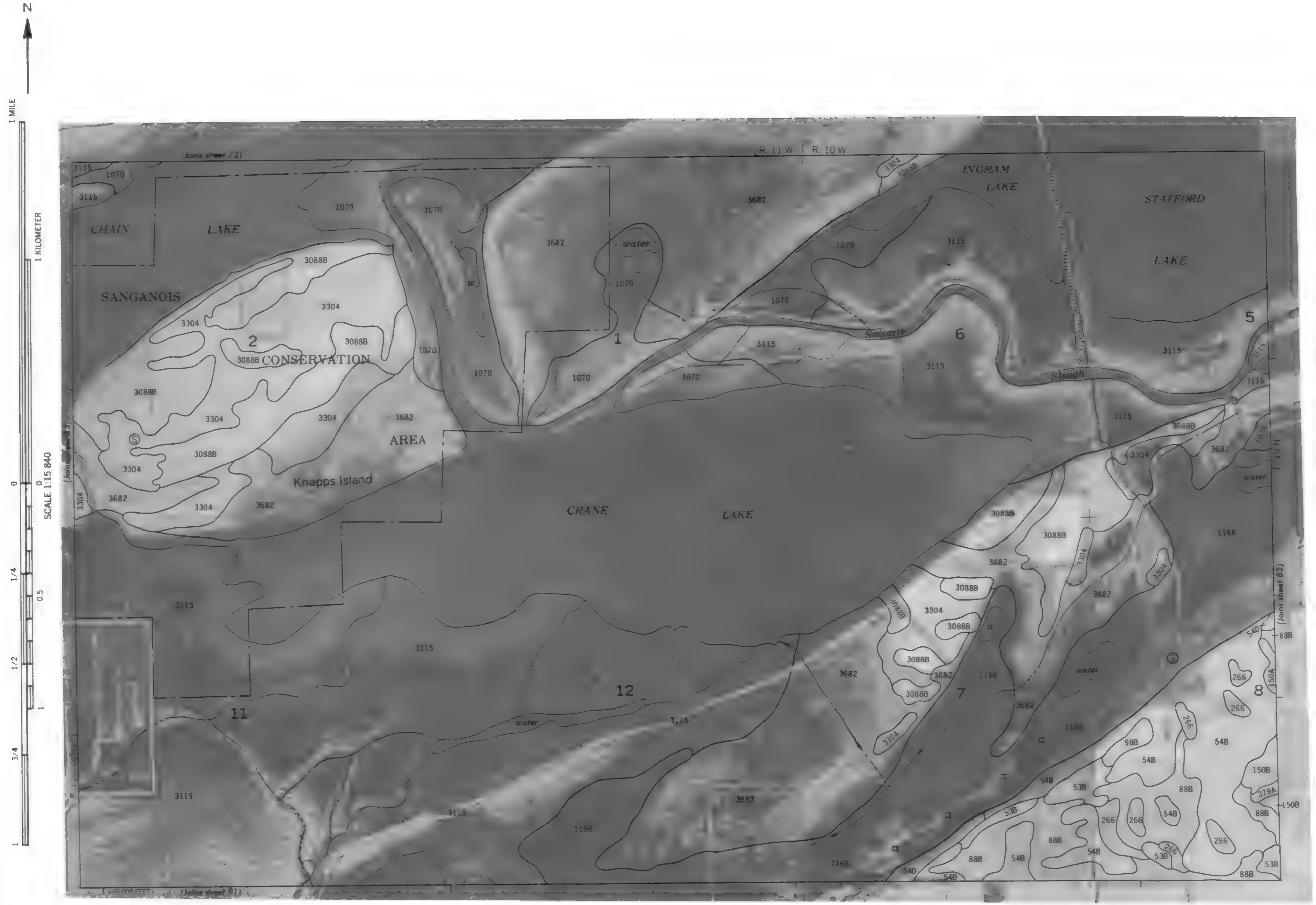

N
(Joins sheet 68)
R. 7 W.
R. 6 W.
(Joins sheet 80)
(Joins sheet 78)
(Joins sheet 90)
T. 20 N.
27
26
25
30
34
35
36
31
HERGET
DRAINAGE
DITCH
Smith
Lake
MENARD
COUNTY
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 69)
R. 6 W.
(Joins sheet 79)
(Joins sheet 81)
(Joins inset, sheet 90)
T. 20 N.
27
28
29
32
33
34

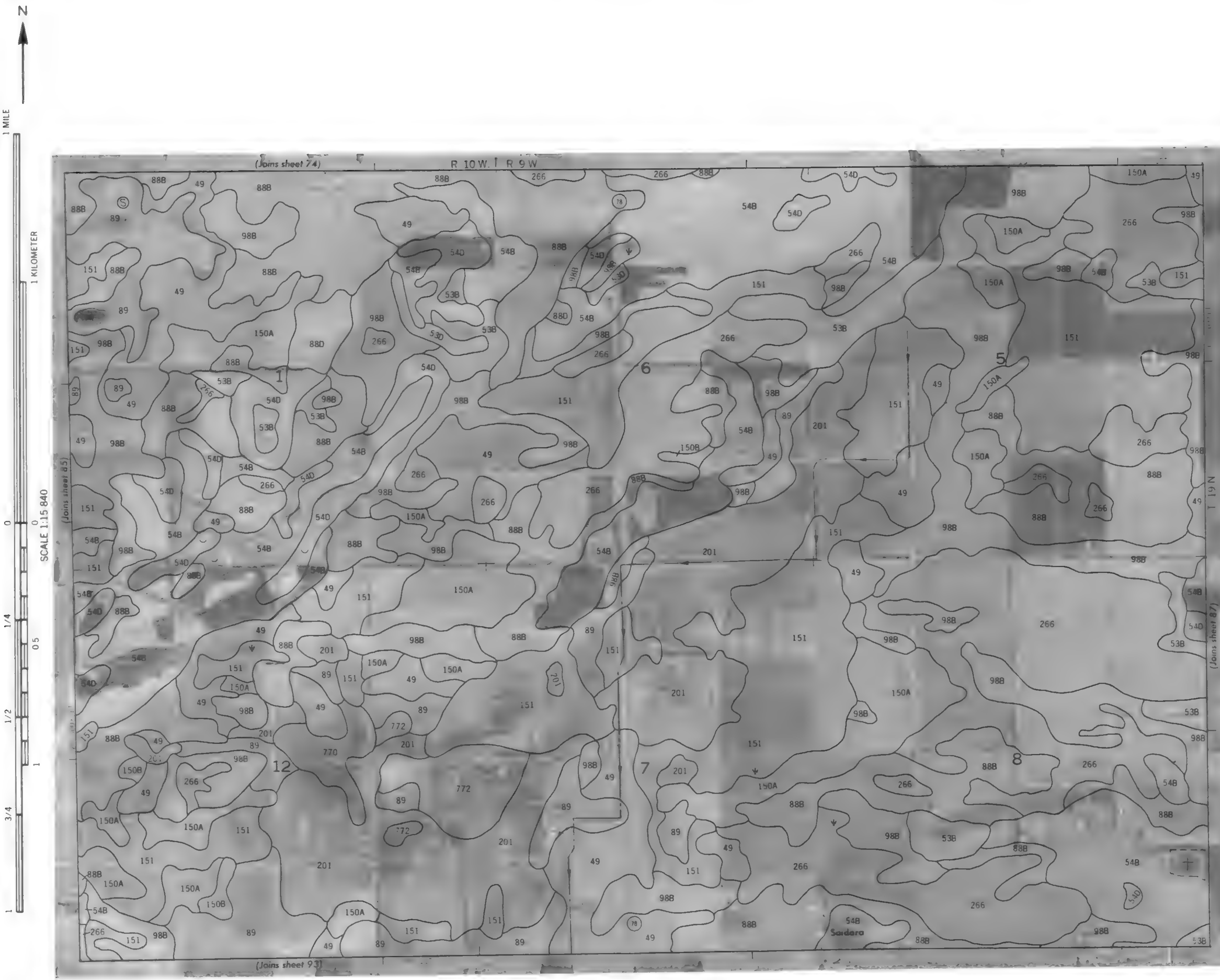

81
N
(Joins sheet 70)
R 6 W.
R 5 W.
T. 20 N.
(Joins sheet 80)
(Joins sheet 82)
(Joins inset, sheet 89)
SLEEPY
HOLLOW
SALT
CREEK
MENARD
COUNTY
25
26
29
30
31
32
35
36
1 MILE
1 KILOMETER
SCALE 1:15 840


82
N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 71)
R. 5 W.
(Joins sheet 81)
(Joins inset 8, sheet 81)
R. 5 W. (Joins inset 8, sheet 61)
T. 19 N.
T. 20 N.
29
28
27
26
35
1
SALT CREEK
MENARD COUNTY
LOGAN COUNTY
Sugar Creek
water
RAILROAD
4000-FOOT GRID TICKS
635 000 FEET


83
N
ILLINOIS
RIVER
SCHUYLER COUNTY
SANGANOIS
water
Hickory
Island
CHAIN
LAKE
CONSERVATION
AREA
CASS COUNTY
Weiner Swale
River Swale
33
34
3
4
5
8
9
10
3115
1070
3304
3682
SCALE 1:15 840
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
1
0.5


N
1 MILE
1 KILOMETER
SCALE 1:15 840
(Joins sheet 72)
R. 11 W
R. 10 W
CHAIN
LAKE
SANGANOIS
CONSERVATION
AREA
Knapps Island
CRANE
LAKE
INGRAM
LAKE
STAFFORD
LAKE
Snicarte
Slough
water
T. 19 N.
(Joins sheet 85)
(Joins sheet 91)
3115
1070
3088B
3304
3682
1166
54B
88B
266
150B
150A
379A
53B
54D
98B


85
N
(Joins sheet 73)
R 10 W
STAFFORD
LAKE
water
Mathew
Bay
Snicarte
Slough
Snicarte
T 19 N
(Joins sheet 84)
(Joins sheet 86)
(Joins sheet 92)
495 000 FEET
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 74)
R 10 W. | R 9 W
(Joins sheet 85)
(Joins sheet 87)
T 19 N
(Joins sheet 93)
1
5
6
7
8
12
Saidora

87

N

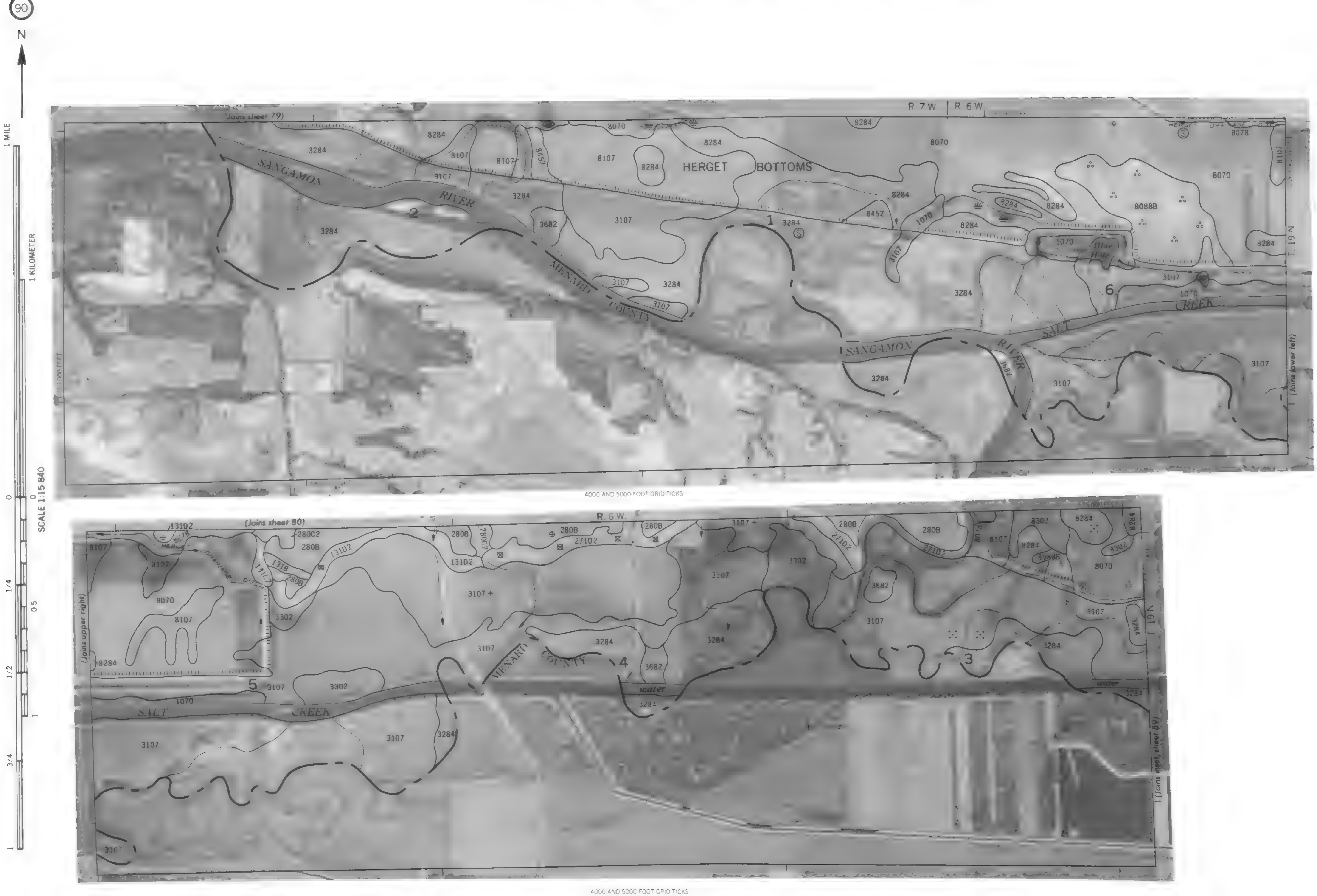
1 MILE

1 KILOMETER

SCALE 1:15 840


88
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
R 9 W | R 8 W
(Joins sheet 76)
(Joins sheet 89)
(Joins sheet 87)
(Joins sheet 94)
T. 19 N.
Creek
Pecan
Pratt
Lake
Bowles
Lake
Angelo
Lake
water
SANGAMON
RIVER
CASS
COUNTY
1
4
5
6
7
8
9
12
13
16
17
18
266
151
150A
379A
150B
88B
98B
131B
53B
54D
54B
54E
53D
770
8070
8107
8107+
8302
8304
8284
8452
8088B
1070
3107
3115
int

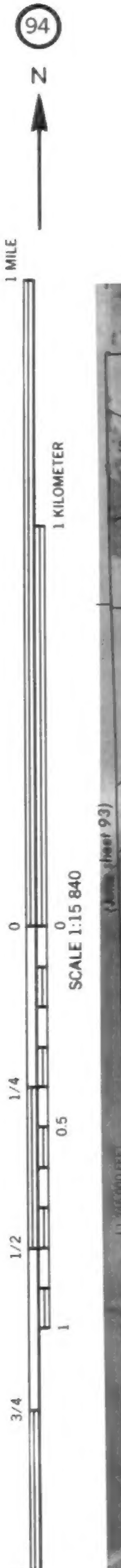

N
(Joins sheet 77)
R 8 W
(Joins sheet 78)
(Joins sheet 88)
T 19 N
SANGAMON RIVER
MENARD COUNTY
SALT CREEK
RAILROAD
water
8070
8452
8107
1070
3682
3107
3284
3088
3404
8284
1
2
3
10
615 000 FEET
621 000 FEET
560 000 FEET
1 255 000 FEET
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


90
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
(Joins sheet 79)
R. 7 W.
R. 6 W.
HERGET
BOTTOMS
SANGAMON
RIVER
MENARD
COUNTY
SALT
CREEK
T. 19 N.
(Joins lower left)
4000 AND 5000 FOOT GRID TICKS
(Joins sheet 80)
R. 6 W.
(Joins upper right)
(Joins inset, sheet 89)
water
4000 AND 5000 FOOT GRID TICKS


N
(sheet 83)
(Joins sheet 84)
R 11 W
R 10 W
T 19 N
CASS COUNTY
SSCA
SANGANOIS STATE CONSERVATION AREA
MOUND LAKE
OTTER LAKE
water
BARKHAUSEN CONSERVATION AREA
(Joins sheet 92)
(Joins sheet 95)
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
1


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
(Joins sheet 85)
R 10 W.
(Joins sheet 91)
(Joins sheet 93)
(Joins sheet 96)
T. 19 N.
DITCH
FAIRVIEW
17
16
15
14
20
21
22
23

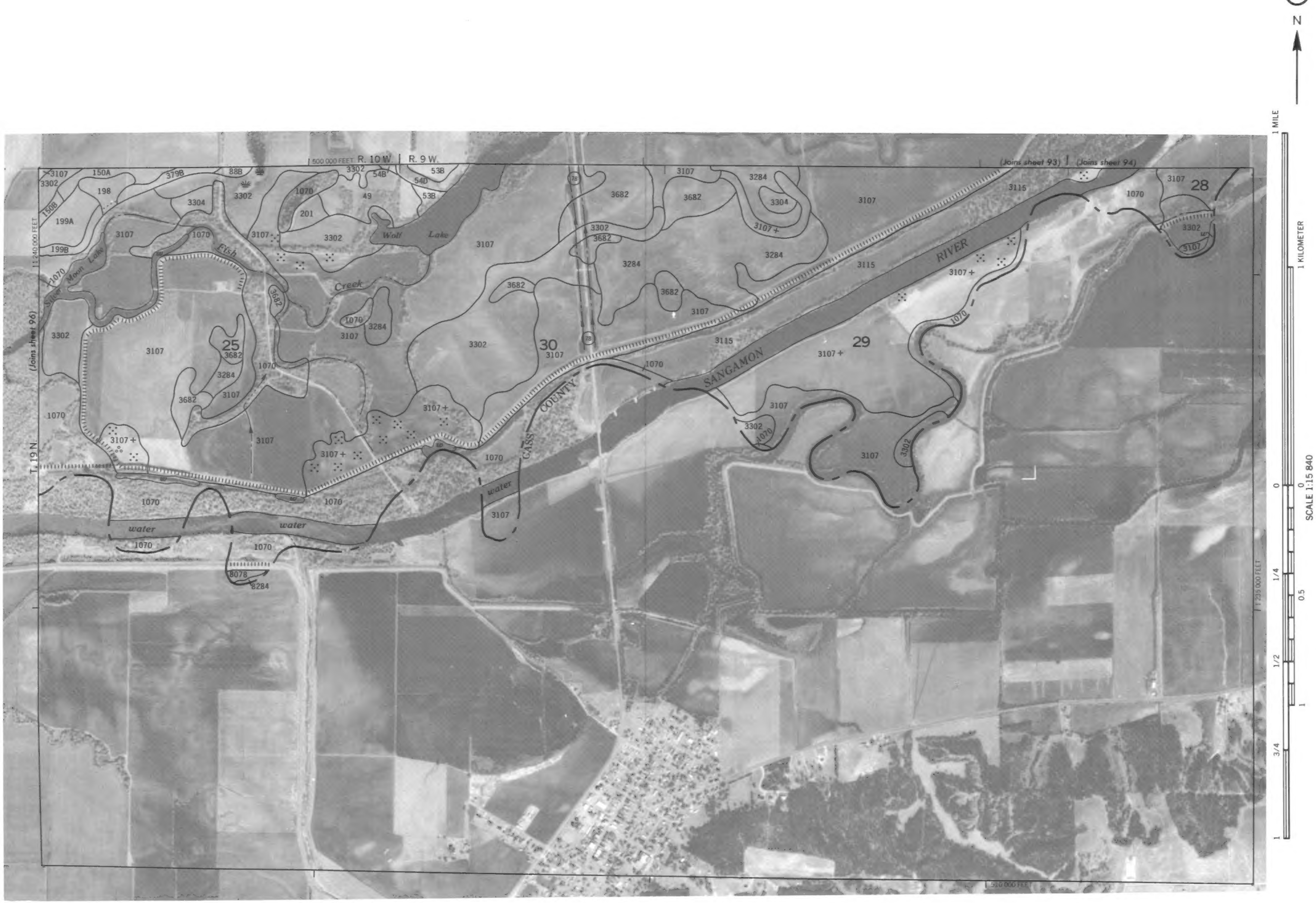

93
N
R. 10 W.
R. 9 W.
(Joins sheet 86)
(Joins sheet 92)
(Joins sheet 94)
(Joins sheet 97)
T. 19 N.
Saidora
13
17
18
19
20
24
Wolf Lake
Bens Lake
Fish Creek
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


94
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1


(Joins sheet 87)
R. 9 W.
Fish Lake
(Joins sheet 88)
(Joins sheet 93)
(Joins sheet 97)
T. 19 N.
Mud Slough
McHenry Slough
Fish Creek
SANGAMON RIVER
CASS COUNTY
water
13
14
15
16
21
22
23


95
N
(Joins sheet 91)
(Joins sheet 96)
OTTER LAKE
BARKHAUSEN
Cuba Island
3304
intermittent
CONSERVATION
AREA
SANGAMON RIVER
CASS COUNTY
CASS COUNTY
Point Lake
Wilcox Lake
water
26
25
30
29
31
32
36
1070
3115
1166
53B
54B
54D
54E
T. 19 N.
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5


N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0.5
(Joins sheet 92)
R. 10 W.
495 000 FEET
1 240 000 FEET
T. 19 N.
(Joins sheet 95)
(Joins sheet 97)
1 235 000 FEET
480 000 FEET
Wilcox Lake
Picket Lake
Back Lake
Finch Lake
Spring Lake
Little Picket Lake
Johnston Slough
SANGAMON
RIVER
CASS COUNTY
29
28
27
26
32
33
34
35
1070
1166
3107
3115
3302
8070
8078
8107
8284
53B
54B
54D
54E
88B
98B
131A
150B
199A
199B
201
266
49


97
N
1 MILE
1 KILOMETER
SCALE 1:15 840
0
1/4
1/2
3/4
1
0
0.5
1
500 000 FEET
R. 10 W.
R. 9 W.
(Joins sheet 93)
(Joins sheet 94)
(Joins sheet 96)
T. 19 N.
1 240 000 FEET
1 235 000 FEET
510 000 FEET
Silver Moon Lake
Fish Creek
Wolf Lake
SANGAMON RIVER
CASS COUNTY
water
25
30
29
28
78
3107
3302
150A
150B
198
199A
199B
379B
88B
3304
1070
201
49
54B
54D
53B
3682
3284
3115
3107 +
8078